SEVENTY-SEVENTH ANNUAL MEETING
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British Medical Association.

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PROCEEDINGS OF SECTIONS.

SECTION OF MEDICINE.

Professor JAMES ALEXANDER LINDSAY, M.D., F.R.C.P., President.

DISCUSSION ON THE MEDICAL ASPECTS OF ATHLETICISM.

OPENING PAPERS.

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ATHLETICISM, its dangers and its advantages, is a subject in which the general public take great interest, but this very interest naturally renders them critical of any statement that may be made by the profession; and hence, in laying down any laws for its guidance, we must endeavour to base them as far as possible on ascertained facts.

A good deal of weight should, I think, be given to the opinions of those members of our profession whose daily practice leads them to deal with the health and habits of schoolboys and young men into whose lives athletics in some form or another largely enter.

Amongst the quaint and wise sayings of Cotton Mather is one which is as true now as a dictum for the preservation of health as it was when written more than 200 years ago. It is, "Let this be remembered, moderate abstinence and convenient exercise, and some guard against injurious changes of the weather, with an holy and easy mind, will go as far in carrying us with undecayed garments through the wildness to the promised and pleasant land which we are bound unto as all the prescriptions with which all the physicians under heaven have ever yet obliged us." Convenient or suitable exercise is an excellent description of well-regulated athletics, and it should be accompanied by a life in which moderate abstinence finds a place.

Dr. Heringham, in an address delivered before the Medical Officers of Schools Association, gives as the first reason for encouraging games at school, the pleasure which boys find in them. This pleasure is no doubt enhanced by the discipline of school and the contrast borne by work to play.

Some years ago I was attending a brilliant scholar, then a young tutor at one of our largest colleges, whose work had come to a standstill owing to a nervous breakdown. When I was trying to find the cause, he said: "How much I wish someone had taught me to play games when I was a boy!" He was a man without the athletic instinct, whose mental qualities had marked him out for scholarship when a boy at school, and he had been educated solely on intellectual lines. Success had come to him at the expense of severe work, but he had grown up without acquiring the mental recreation which games afford.

Besides the mental relaxation and pleasure which games bring into the lives of the young, their value educationally in developing the power of organization, in establishing self-control, obedience and courage, is great, and they therefore act as a great force in developing character.

It is curious to note the revulsion there has been during the past ten years against basing the future of young men solely on their powers as examination candidates. In filling up the Rhodes Scholarship stress is laid on the character of the applicants and on the relative position held by them amongst their compeers. In the Egyptian and Colonial Civil Service, also, I have reason to believe that appointments are not made solely on intellectual grounds, but also on the possession of those powers which boys gain most readily in school games; and if we remember that an empire so vast and scattered as ours is needs men possessed not only of good intellectual but of good physical qualities, the reason is not far to seek.

Of the value of athletics in developing the young I do not propose to speak at length, but I would point out that during the past thirty years there has been steady progress in the provision of opportunities of athletics for all classes of the population. The growth of public parks and the provision of playing grounds for boys in the elementary schools, all point to the fact that the public is aware of the necessity of providing opportunities of athletics for the young.

In my own experience the change in physique from the somewhat delicate-looking preparatory school boy who enters the public school at 14 to the robust young man who enters the university at 18 or 19 bears eloquent testimony to the benefit derived from four or five years' training at the public schools. It has always seemed to me that the most robust type of undergraduates are sent up by those schools in which the athletics are of the most strenuous type. I mean schools which embrace Rugby football and cross-country runs amongst their organized exercises.

Mortality.

In considering the dangers arising from athletics, I thought it would be interesting to arrive at some idea of the mortality occurring in connexion with games amongst schoolboys.

I therefore wrote to the medical officers of several of the larger residential English public schools, asking whether any death had occurred during the past twenty years during or in consequence of athletics. I received thirteen replies, and as the schools in question contain over 6,500 boys, and as the period covered is twenty years, I think the figures represent some experience. In this way I received the reports of five deaths. Of these, in three there is no doubt that the cause of death was accidental, and there is no question of any one of these three deaths being due to physical failure due to improper exertion. The remaining two deaths will, I believe, be dealt with by Dr. Clement Dukes, who is following me in this discussion. The first was that of a boy who was struck in the abdomen by the knee of an opposing player during a game of Rugby football. Although apparently not badly injured at the time, he died within a few days from injury to the lesser bowel. The second was that of a boy who, after a heavy meal at the tuck shop, was doing some exercises in the gymnasium when regurgitation of food from the stomach occurred and he died from suffocation. The third was that of a boy who fractured a cervical vertebra from a fall from the horizontal bar in the gymnasium, death occurring about a year after the accident.

In Oxford during the same period 2 cases of death have occurred during athletics.

One, a man with double aortic disease, died during a game of hockey. He was aware of his condition, and had been warned not to play strenuous games, but preferred to take the risk.

The other case was that of a high jumper, who, after a heavy and indigestible meal, went to the running ground, and before practising jumping started to run at a slow pace to loosen his muscles, and died quite suddenly after running a few paces. This was a case of death occurring during, rather than due to, athletics, as the distance run was short and the pace slow.

This, then, is the death roll occurring from or during athletics during twenty years in a number of public schools with an attendance of over 6,500, and in a university with 2,000 undergraduates.

I thought it might be of interest to obtain statistics from the same schools of cases of sudden death occurring amongst apparently healthy boys quite apart from athletics. I received from the same source information of 4 cases of sudden death quite apart from athletics during the same period—twenty years.

The first was that of a boy who went to bathe after eating a heavy meal of cherries, and died immediately on entering the water. At the *post-mortem* examination there were no signs of death from drowning, but the stomach was distended by a large mass of cherries, death having occurred from heart failure due to the distended condition of the stomach.

The second was that of a boy who was taken ill during dinner, rapidly became unconscious, and died the same

night. The *post-mortem* examination showed that death was due to cerebral haemorrhage.

The third was that of a boy who died whilst sitting at his desk. Death was probably due to an abscess in the brain, as the boy had some time previously undergone an operation for mastoid disease, and had suffered from convulsions whilst recovering from the operation.

The fourth was that of a boy who died whilst watching a cricket match. The school medical officer, who was present at his death, believes that death was due to cerebral mischief, but a *post-mortem* examination was not obtained.

I mention these cases as, though they occurred apart from athletics, it is equally clear that they might have occurred during them; and they emphasize the necessity of a *post-mortem* examination in all cases of sudden death occurring during games.

The Heart.

If we consider the organs likely to be temporarily or permanently damaged by over-indulgence in athletics, the heart is naturally the first organ that suggests itself. In endeavouring, however, to estimate the relative value of athletics in the production of heart mischief there are one or two points which need attention.

Leaving out the question of gross injury to the valves, which occurs so rarely in amateur athletics that it may be neglected, the signs of damage to the heart by athletics are not very definite. It is difficult to appreciate the enlargement due to slight dilatation or slight hypertrophy, and still more difficult to verify the diagnosis by means of the fluorescent screen. Arrhythmia, tachycardia and bradycardia, and dyspnoea on exertion all are symptoms which may originate from many other causes than athletics.

In examining the hearts of schoolboys it is well to remember the observations of Dr. Mackenzie, who, in his work on the medical examination of school children, points out that the cardiac area on percussion appears abnormally large, and that hence caution is necessary in framing any conclusions as to the presence or absence of cardiac enlargement. He also lays stress on the fact that the rhythm of the heart is less constantly regular in children than in adults, and that slight causes may disturb the rate and regularity of the pulse. This minimizes the importance of both these symptoms as an index of a morbid condition of the heart in children.

In coming to any conclusion as to the precise value of athletics in causing morbidity of the heart, it is, above all, necessary to get a clear history of the habits of the patient under examination. Excessive smoking, the abuse of alcohol, gluttony, insufficient rest, and sexual excess—any or all of them may enter into a young man's life and produce exactly the same symptoms that are attributed to athletics. Also they are not likely to be obtruded on the attention of the physician by the relatives.

The extent to which immorality prevails in schools is not easy to estimate, but, from twenty-five years' experience of work among undergraduates, I am clear that it is a factor which should not be neglected in considering signs of perversion of the heart's action, sometimes wrongly ascribed to athletics.

My own impression is that, while the love of games is not a clear indication that a boy leads a pure life, it is certain that the physical fitness required by the more strenuous games is a valuable check to a boy falling into bad habits. Also that when he grows older and realizes the seriousness of the habit, a strenuous life of the athletic type is a valuable help to re-establishing self-control. On the other hand, the loafer is not only less likely to make an effort to redeem himself, but readily adopts other accompanying vices.

That the toxins produced during febrile attacks have a prejudicial effect on the heart's action is certain, and it is both during and for some time after an illness of this character that damage may result to the heart if athletics are practised.

Dr. Houver, in Osler's *System of Medicine*, states that "up to the present time there exists no absolute pathological and clinical proof of acute passive dilatation and death from excessive muscular exercise; although there are excellent physiological and clinical reasons for believing they occur, there always lurks the suspicion of other contributing factors in such cases, namely, a remnant of a former infection, congenital defects or manner of life." Sir Clifford Allbutt, in a discussion on the effects of long-distance runs, states that the young and healthy heart is so resilient that it was, he believed, "impossible for any harm to be done to it by any effort which the boy's own muscles were able to entail on it."

With this statement I entirely agree, and I believe that in sound boys and young men the risk to the heart from athletics is very small, provided their habits are good and there is no trace of constitutional illness present.

That cases of perversion of the heart's action do arise in the course of athletics is certain; but a more careful inquiry into the accompanying circumstances than is usually made is necessary before assigning the prime cause to athletics.

To hark back to Cotton Mather's dictum, we must include moderate abstinence with convenient exercise.

With regard to the possibility of the lungs being damaged by athletics, I would only draw attention to the necessity of restraining boys suffering from asthma from violent exercise. They bear hard exercise badly, and are likely to be permanently injured by severe, long-continued muscular effort.

Prevention.

Turning now to the consideration of the precautions that should be taken to minimize the dangers arising from athletics, it may be of interest to note the recommendations made by the Medical Officers of Schools Association for the regulation of athletics at the public schools. They are as follows:

1. Every boy entering a school should be submitted to a thorough medical examination. This enables the school doctor to strain off the unsound, and to grade those who, though not unsound, are yet less robust than the normal, to the form of athletics they may undertake with safety.
2. A boy's fitness for physical exertion depends upon his physical and constitutional ability, and is not merely to be gauged by age.
3. Careful observation of the behaviour of the new and younger boys in their ordinary games, and of the physical effects thus produced upon them individually, affords a valuable means of estimating the fitness of each for subsequently undertaking more strenuous exertion.
4. It is most important that there should be an ample interval (one hour at least) between the time of the previous meal and the beginning of active exercise.
5. Special caution is required in permitting a resumption of active exercise to convalescents, particularly after diphtheria, influenza (including influenzal catarrhs), rheumatism, measles, and during a period of rapid growth.

These rules are a valuable guide to the regulation of school athletics, and if carefully observed greatly reduce the chance of constitutional damage from athletics.

It is not possible, unless a school medical officer devotes his entire time to the school, that he should undertake the actual supervision of school games, nor is it necessary that he should do so. The signs of undue distress arising from exertion are so obvious that it is as easy for a master with a little experience to pick out those boys who are thus affected and refer them to the school medical officer, who, after grading the boys for exercise, acts really as a consultant, and uses his special knowledge to supplement the supervision of either house masters or of those masters who take an active interest in games. For the more severe contests, such as boat racing or the cross-country competitive runs, it is wise to have the boys who intend to compete examined before and occasionally during the period of training.

At Oxford there is little direct medical supervision of athletics except in the case of the university boat. The crews intending to compete in the university trials are medically examined a week or two before the race, and the members of the crew actually selected are re-examined later. Visits are made occasionally by the medical officer to ascertain how they stand a long course, and any member showing signs of undue distress is again thoroughly overhauled. To the other athletic clubs the medical officer stands rather in the position of a referee, examining only those cases sent to him by the officials.

In college boat clubs there has been a greater tendency of late years to refer doubtful members of the crews to a doctor for examination before training begins. This has acted beneficially both to the individuals and to the boats, as it has obviated the necessity of late changes in their members.

Though there is little direct medical supervision of athletics at Oxford, it is interesting to note that few cases of constitutional injury from athletics come to the notice of the medical men there, and I believe the experience of the Cambridge medical men is similar.

There are two forms of athletics which have received severe criticism from members of our profession. Some forty years ago a crusade was originated against the University Boat Race, and it was assumed that the duration of life was prejudiced in those taking part in this contest. Statements of this kind, coming from members of the medical profession, have an authentic ring, but unless they rest on the basis of ascertained facts they are unjustifiable and their only effect is to create a temporary scare, which in the end is allayed by some member of the profession sufficiently interested in athletics to collect facts bearing on the point.

To ascertain what was the actual fate of those rowing in the Inter-University Race, a most painstaking inquiry was made by Dr. John Morgan, of Manchester, who traced the life-history of the individual members of the Oxford and Cambridge crews for forty years. He was from these inquiries able to prove:

1. A longevity amongst the competitors comparing favourably with men of the same standing.
2. A condition of health and activity in the survivors above the average.

Though Dr. Morgan's book (*University Oars*) was written thirty years ago, it still remains the ablest and most complete inquiry into the effect upon health produced by severe muscular exercise undertaken by healthy young men at a time preceding arterial degeneration. It is only by the careful collection of statistics such as this inquiry provides that we are enabled to promulgate justly edicts for the guidance of the lay public.

School and cross-country races exceeding one mile in distance for boys are another form of athletics which have recently been condemned by some members of our profession. Now, runs form an important feature in many of the large public schools, and are useful not only in training boys to slow continued exercise and developing their powers of endurance, but also as a preventive to loafing when the playing-fields are unfit for games. With some boys, particularly those of a self-indulgent type, they are not popular, and hence, indirectly, with some parents. Yet when a boy has got over the initial dislike to a rather dull form of exercise, he often discovers in himself unknown powers of endurance, and realizes the good he gets from this form of exercise.

This variety of school exercise requires, as does rowing, medical supervision and a close co-ordination between the school doctor and those masters responsible for athletics. There will always be a limited number of boys to whom runs of any length will be harmful. Asthmatics and boys with valvular disease of the heart should always be excused from runs, and there are others in whom it is difficult to detect organic disease to whom runs are a difficulty. I mean boys subject to undue dyspnoea by runs of a moderate length. These boys should only take part in runs where frequent halts are allowed, and, unless they improve with practice, should be excused from runs altogether.

School and cross-country races over a mile in length are competitive in character, and should only be permitted to boys known to be organically sound, in good physical condition at the time of the race, and who have undergone preliminary training in runs for some time previous.

If these conditions are adhered to I believe the risk of injury is exceedingly small. This is the opinion of the large majority of school medical officers, and it is confirmed by the experience of the medical residents in Oxford and Cambridge, who see the public school boy within the first two or three years after leaving school.

Dr. Armstrong of Wellington College has furnished me with the results of an inquiry made by him amongst those who have run during the twenty years from 1884 to 1904 in the "big side" runs (9 to 11 miles). From 85 inquiries sent out he received 54 replies. Of these, 53 were unanimous in saying that they received nothing but good from the runs; 1 considers that his present ill health is due to his having partaken in the runs. Any injury received by him must, however, have remained latent, as he passed the stringent medical examination for entry into the army on leaving school. Of the competitors at Wellington College in the cross-country steeplechase (1¾ miles), Dr. Armstrong gives 198 as the number taking part during the thirty-four years 1870–1904. Of these 185 are still alive. Of the 13 deaths:

4	were killed	in action.
3	died	by accident.
1	died	from Indian fever.
1	,,	a traumatic clot.
1	,,	consumption.
1	,,	brain disease.
2	,,	unknown causes.

It is statistics such as these that we want to make any inquiry into this question of value, and I hope Dr. Armstrong's example will stimulate other school medical officers to continue the inquiry.

One point I would like to put to this meeting in concluding these remarks. Are we not as a profession a little inclined to put our consideration for the individual before that for the race? It is a difficulty in private practice that our attention is directed so closely to safeguarding the future of the particular patient, to ensuring that he takes but little risk, that the question of the duties of that individual towards the race may easily escape our notice.

It is, in my opinion, a duty owed by the profession to assist in the rearing of a hardy race, active both mentally and physically, and as free from self-indulgence as is possible. To our care a mighty empire has been entrusted which we shall keep just as long as the race produces men in sufficient numbers of intelligence, good physique, and courage. But if children are reared in luxury, and without exposure to any risk, it is difficult to see whence are coming the men to rule India, the Nigerias, East Africa, and other of our possessions which we hold in virtue of our being the dominant race.

II.—CLEMENT DUKES, M.D., B.S., F.R.C.P.,

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Now that physical education is assuming its appropriate place in the education of the young of all grades, it is meet that the British Medical Association should discuss the question in relation to its medical aspects, in order that dangers incidental to it may, as far as possible, be avoided.

It therefore behoves us to ask ourselves these two questions:

1. Is injury possible from unwise exercise?
2. Is harm, if any, preventable by reasonable care?

It is sometimes forgotten that the virtue of games is for the well-being of the players, and not for the entertainment of spectators.

The Grecian Ideal.

The highest development of the body was an essentially Greek trait at an epoch when Greece excelled in practically every department of human effort. The citizen of Athens in the time of Pericles has never had a superior in mental fertility and endowment, in speculative wisdom, or in artistic achievement and appreciation.

The physical and intellectual beauty of the ancient Greeks, too, is traceable to the public games, which formed part of a religious observance. No other nation has ever produced such perfection of human form; no other institutions have ever so deeply influenced the moulding and elevation of the mind.

Recreation a Necessity.

Fortunately, we live in an age, at all events in this country, when recreation of all kinds, in the proper sense of the term, is deemed a virtue, and consequently a necessity. This is a modern development of racial character whose promotion has been aided by all sorts and conditions of men and women, but mainly by the members of the profession to which we have the honour to belong, through recognition of its paramount value in the attainment of the highest form of general health. The idea of the indispensableness of recreation, mental as well as physical, has been a process of slow growth; hence its signal success. Its progress, however, in my judgement, is still in its infancy.

National Success.

We, as a nation, owe our success mainly to our mental and bodily vigour—a vigour which is irrepressible. What other nation would dream of playing football and polo in

Starling represents the work of the heart by the formula, $W = wR + \frac{wV^2}{2G}$. In a healthy heart and aorta nearly the whole of the energy of the left ventricle is stored up in the walls of the aorta during systole and paid out during diastole, so the work of the ventricle is chiefly represented by the weight of the blood thrown out at each stroke multiplied by the resistance to its exit, and the strain on the aortic valves and the left ventricle is represented by the resistance or pressure within the aorta. This pressure is induced by the peripheral resistance, but it is produced by the ventricle, so, no matter what stress or strain the rest of the body is subjected to, the heart can only be strained by the stress which it itself produces. The object of the work of the heart and lungs is to supply the tissues with oxygenated blood, and the greater the exercise of the body the greater the demand for oxygenated blood; hence, the question in athletics is, Can the heart and lungs meet the demand? If so, their slight impoverishment can soon be renovated. Well-trained muscles have a good reserve of energy which is not easily exhausted, and in their training the heart and lungs have also been trained to meet the demand, hence the work of all the organs goes on harmoniously. In running or stiff climbing there is a great demand for oxygen, and under these conditions the respiratory muscles are often fixed, and so the right side of the heart does not get its wonted assistance from respiration, and so under such strain it is much more likely to give way than the left side. For all feats of running and climbing the individual should not only have a healthy heart, but his lungs should have a good vital capacity. The oxygen-carrying power of the blood should be high, and as the weight of the charge expelled by each stroke of the pump is an important factor in stretching and distending the main conduit pipes, we should see that the heart is not handicapped by any hydraemic plethora. It is the quality of the blood, not its total amount, which is here of importance.

Under proper directions no injury—apart from accidents—need attend any of the games or contests carried out in this country, and by improving the physique of the nation we raise the health standard and the moral and intellectual character of the race—an improvement which may go on from generation to generation in a geometrical progression. It is your physical wrecks who become sexual perverts, and your degenerates who fill the asylums, often after having laid the foundation for untold misery in the next generation.

This highly necessary physical training should commence at home and in the elementary schools, but I am afraid before we can get it universally adopted we must educate our teachers, and draw them from a superior physical class, because, in the present day, any one seems to be considered physically fit to be a school teacher. I am afraid that it cannot be said that even the medical profession are always fit guides in this matter. The late Ian Maclaren, after surveying a medical gathering, said to me that he thought from a physical point of view they would compare rather unfavourably with a similar conglomerate of the clerical profession. He was of opinion that it was necessary for a clergyman to be more or less constantly before the public gaze, and, therefore, as a rule, to be successful he must have some public presence; but nowadays the medical profession adopt other methods of advertising themselves. The result is that parents who select the professions for their sons choose the clerical for the able-bodied; and, now that the necessity for the vigorous, robust manhood of the general practitioner is on the wane, they make specialists of the weaklings. Brethren, these things ought not so to be.

Dr. GORDON GULLAN (Liverpool) said: It seems to me that athletics can be divided into two groups, (*a*) those at school, which are indulged in up to the age of about 17, and (*b*) at the university, etc., which are practised by youths from the age of 17 and upwards. My own personal experience deals to a greater extent with the athletics of the youth who is studying at the university or is articled to a business or professional firm in a large city, and does not deal to any large extent with those found at our large public schools, and therefore with the athletics of boyhood. I must, however, first say something with regard to class (*a*), even if I do not speak with the authority of Clement Dukes, of Rugby, or other medical officers of big public schools. The first feature of the athletics of the English public school boy which strikes the impartial observer, is the whole-hearted manner in which the vast majority of the boys enter into the various games and contests, and that even the smaller number who shirk the games usually take a keen interest in the results of the various house and school matches. This is in itself a sure indication that the boys who go into those varied forms of athletics do not derive any physical constitutional harm therefrom. But the *bête noire* of school athletics seems to be the long distance cross-country runs or paper chases, which, according to some authorities,[1] is "wholly unsuitable for boys under the age of 19, as the continued strain involved is apt to cause permanent injury to the heart and other organs."[1] I must at once differ from this opinion, as, from many personal reminiscences when a boy, I never found long paper chases of seven to ten miles as severe a strain, even when going over heavy ground, as many a hard fought match when playing in the Rugby scrimmage; and this was not only my experience, but that of my schoolfellows. Moreover, some of the lighter built and younger boys enjoy this form of recreation, and are more serious competitors than the older and more robust boys. I am sure that no sensible physician or practitioner would oppose the medical examination of all boys before entering into these hard physical exercises; but I would like to give one word of warning: the medical man who conducts such examinations should be well versed with the ways of boys and put his examinee at his ease. The examination should not be made immediately after vigorous exercise, but during a period of rest, and preferably when the boy has had no previous warning, lest he be nervous.

To those medical men who are of opinion that these severer forms of school athletics should be discontinued, I would rather ask for statements of injuries done than pious opinions and platitudes. Perhaps I speak strongly, but I feel strongly, and I am sure that everything points to the physique of the nation degenerating, and with the physique its character and mental force, if we discourage in any way the practice of the British schoolboy in his vigorous forms of exercise.

I have said that the boys may be medically examined who enter into the more strenuous of our English games, but I would much more vehemently urge that the boys who do *not* enter into the games, those who are looked on as "slackers," be medically examined, that the size and expansion of their chests, their hearts and kidneys be thoroughly overhauled, and then that compulsory games be set for them at the discretion of the medical officer. I have no doubt that in this field he will find many interesting specimens who require to be turned on to the football or cricket fields, or, if of poor physique or weak muscles, would benefit by some military and physical drill. This brings me to one other point with regard to the physical life of public schools. Much more value is undoubtedly to be obtained by outdoor games and sports than by compulsory military drill and the gymnasium, and I regret to see that one of our foremost public schools has recently brought into vogue compulsory gymnastics. These latter I would like to see used in every large school for those members who from some defect cannot go in for the regular orthodox games, including cross-country running. My critics will at once point out the magnificent physique and the fine development of bone and muscle of the gymnastically-trained Swede or drill sergeant; but who would not prefer the more wiry and alert development found in the 'Varsity Blue, even though at one time he was adorned by the "Eton slouch"? For those present will be familiar with the condition known as "muscle bound," which is found at its highest grade of development in an army gymnastic instructor or the instructor of a school of physical culture. This, of course, is due to the great development of flexor and extensor muscles, whereas the schoolboy athlete develops the muscles required for the game or sport indulged in, and at the same time, as the game usually includes a swift-travelling ball or a rapidly-dodging competitor, his eye and nervous system are trained to receiving sudden impressions and to giving rapid response thereto, and this.

[1] Boys' Races, BRITISH MEDICAL JOURNAL, February 13th, 1909, p. 441.

rapid response entails quick contractions of certain muscles, with quick movement of joints, and at the same time a readiness of resource and power of initiative. Before passing from this group, let me urge all head masters and officials of big public schools to avoid supplanting the British schoolboy by a muscle-bound and more sluggish youth, even though his chest measurement may be slightly greater and his biceps somewhat bigger.

Among the many great responsibilities which rest with school officials, none is greater than that of seeing that the physical training of the boys under their charge is suitably carried out; and, as I have endeavoured to portray, the ordinary healthy child is best catered for by the vigorous games and sports, without much more supervision than that of the *Captain* of his "eleven" or "fifteen." The weakly, delicate, fragile boy who is not keen on the more rough games, requires more careful supervision, and should be given more suitable drills, according to any physical or constitutional defect found. When we are reminded by the opponents of the dangers and injuries resulting from the severe athletics of the schools, let us consider for a minute the reverse proposition, and let us imagine for a moment the number of men turned out of our public schools with healthy digestive organs, good muscles, good physique, and, above all, healthy and sane nervous systems, many of whom have not come from a very strong stock, and who, but for the playing-fields and the cross-country runs, would not have been nearly so fit for the strain of hard work.

I would like to endorse the views held by other writers,[2] that cross-country running is not nearly so dangerous or punishing to a healthy lad as some of the shorter races, notably the quarter-mile. I have quite recently asked the opinion of many runners, both boys and men, and they strongly, and very nearly unanimously, corroborate this view. It must never be forgotten that the schoolboy is always in training. He does not drink, he does not smoke, and he is at the age when Nature expects him to use his muscles and limbs. I cannot recall a single case of a boy who has been permanently damaged by the athletics of his school, nor have I come across any man who has pointed out to me that his cardiac condition was due to over-athleticism when a boy.

If we now turn to the second group—Athletics at the University, namely, the athletics of young men—the reverse is the case. I have come across several instances in which the heart of a youth has been damaged temporarily for some time, and, in some instances, the dilatation of the heart appears to have remained permanent. In all these instances the physical exercise was undertaken when in an unfit condition—I mean by the term "unfit" the man in question not being in proper training. I would briefly enumerate as instances the three following cases:

1. J. F. G., a well-developed university student, aged 21, after having for some months not taken any vigorous exercise, determined to train and row in one of the "eights." On the second occasion that he went on the river, before he had done any tubbing or other work of any extent, the proposed eight had a trial row, this man being the only untrained member. He pulled hard, and just before the finish of the race he collapsed over his oar, in what he described as a half-faint, and felt thoroughly done. He was taken to the nearest hotel, put to bed and given some brandy and water. A few days afterwards he had all the signs of acute dilatation of the heart, rapid feeble pulse, sighing respiration, some cyanosis, coldness of the extremities and a general "done" feeling. His cardiac impulse was diffuse and feeble, the dullness was increased to just outside the nipple, four inches from the middle line, and the first sound of the apex was not clear, being short and dulled. On the slightest exertion he got breathless, and epigastric pulsation showed itself. This man had to stay in bed for a number of weeks, and then, for at least six months, led a very quiet sedentary life. Gradually his cardiac condition became normal and the symptoms disappeared, but it was not till four years later that he was able to resume a fully active life, though even at this date, which is ten years since his collapse, he cannot go in for the more severe forms of sport. Boxing, which, contrary to medical advice, he tried on one occasion, produced a recurrence of the condition which disabled him for several weeks.

2. W. G. H., aged 20, also a well-built youth, being confined closely to office work during the winter months, decided to undergo a course of training in a much advertised establishment. After one or two hours' exercise he began trying weight-lifting, and, after lifting a 250 lb. barbell several times above his head, he nearly fainted and collapsed, being in a condition practically the same as that described above. In his case, however, there appeared to be some more hypertrophy of the left ventricle, as the impulse was stronger and the first sound of the apex louder. It required a period extending two or three years before this man was able to resume active exercise, and even now his heart, though in all apparent signs normal, is unfit for any severe strain, and on one or two occasions he has consulted me for slight relapses after an extra strain.

3. G. F., a strongly-built man, a county footballer, after having had a severe attack of influenza, and thus being off the field for six weeks, returned to play in a hard match, the result being that he felt very done up and his condition was very similar to those narrated above. His recovery was, however, more rapid, but he has never played football again, and he is rather nervous, possibly unduly so, of undertaking extra physical exertion.

I could give one or two more similar cases—in fact, at the present time there is in my ward at the Stanley Hospital a youth, aged 17, who collapsed after playing a rather long game of football in the month of June when not in training. He is improving under treatment. The symptoms and signs were the same, with the addition of a soft systolic bruit accompanying a short first sound. This bruit is disappearing with the rest in bed.

During the past few months I have examined several university students and others immediately after running races from a quarter to one mile, and the immediate effect is a temporary dilatation of both sides of the heart—but especially the right—with pulse-rate varying from 120 to 140, respirations quick and shallow up to 40 and even 50 per minute, and marked epigastric pulsation, increased apex beat, and enlargement of cardiac dullness. In a short time—three to four minutes—the pulse usually falls to 100 and the respirations to 24, and in twenty to thirty minutes the pulse is normal or only a little quickened, epigastric pulsation gone, and apex beat and cardiac dullness normal again. In the case of men out of condition—that is, not fit, untrained—or who have recently been the subject of an acute disease such as influenza, the heart muscle having been poisoned by toxins, there is great danger of this temporary dilatation not subsiding owing to the damaged condition of the heart muscle, and then acute dilatation results as instanced above.

Temporary albuminuria (functional) often results from a prolonged physical strain, especially in boys and youths, but it usually soon passes off with rest, warmth, and a light diet—preferably milk—and thus should not be a bar to that individual going in for active exercise. He, however, should be under medical supervision.

In conclusion, I would strongly urge the medical profession to encourage rather than hinder outdoor sports and contests, both in boys and youths, of course with the proviso that the candidate has normal organs and is in good condition—that is, properly trained. Under these conditions no danger is to be expected to the candidate, but much good will be derived from improved physique, developed organs, and elevated moral character—namely, endurance, self-sacrifice, resource, sportsmanship (good-fellowship), and courage. It is to these attributes, coupled with good physique, that the British nation owes its position—and may I say possessions?—in the world; it is through these attributes that it gained these possessions, and it is only by retaining them that the British Empire can expect to survive in the struggle for existence among the nations, which is one of the laws of Nature. As long as British boys and youths continue to enter into our British games and athletic contests with zest, so long will the physique and character of our race remain worthy of its high traditions.

Dr. TYSON (Folkestone) said that the meaning of the discussion surely must be the keeping of the body in good health by the aid of judicious exercises throughout the whole period of life. To understand this question properly, the order of growth and development of the body must be intelligently understood in its various parts—namely, physical, mental, and moral. Again, the effects of the two great laws affecting mankind—namely, that of heredity and environment—must be carefully considered. Physicians had to deal with the physical side of Nature. The best means of training the body in order to enjoy good health were: (1) The general health must be attended to by the enforcement of proper ventilation, proper feeding, and proper clothing for all;

[2] Drs. Leslie Thorne Thorne and Charles F. Harford, ibid., February 20th, 1909, p. 502.

were these rules taught in all schools, and efficiently and systematically carried out, half the hospitals would be shut up, especially in reference to the out-patient department, and half of our medical practice would vanish. It was well to remember what Montaigne had said in reference to man as he should be: "I would have the disposition of his limbs formed at the same time with his mind. 'Tis not a soul, 'tis not a body we are training, but a man, and we must not divide him." (2) The exercises must vary in character and amount, according to age, the surroundings, the inclinations, season of the year, and perhaps his income. The important point was that exercises should be begun early in life, and continued until death. Every man and woman should have at least one physical hobby.

Resolution.

On the motion of Sir Lauder Brunton, seconded by Dr. Lauriston Shaw, it was unanimously resolved to send the following resolution to the Central Council:

> That the Medical Section of the British Medical Association meeting at Belfast desires to suggest to the Central Council that they should take into their consideration the question of securing a professional announcement as to the most suitable manner in which athleticism in schools may be so organized and controlled as to achieve the maximum of benefit and to reduce to a minimum any risk of harm to the individual schoolboy.

A NATURAL EXPERIMENT IN CARDIAC STRAIN.

By Clive Riviere, M.D.Lond., F.R.C.P.,

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In a careful examination of schoolboys it must be the experience of all that cardiac enlargement is not infrequent, and sometimes enlargement of no inconsiderable degree. Its explanation is not usually apparent: the boy may appear well nourished and in good health, and we are apt to console ourselves with the fact that the condition is not uncommon, and, perhaps, to blind our judgement with loose ideas about "growth of the heart" and hearts "of infantile type." With a view to co-ordinating my own ideas on the subject of cardiac enlargement in boys, I have carefully examined the hearts in a large number of boys taken at random, and also under conditions which necessarily throw a strain on this organ. The importance of the inquiry impressed itself upon me as the result of an examination of a party of 40 boys chosen for a school holiday excursion, and a description of this excursion and its results forms the basis and, to some extent, the object of the present paper.

The party consisted of 40 boys of ages ranging from 7 to 14 years, and was conducted by a most enthusiastic and energetic head master, with the assistance of three or four junior masters. The excursion was of a week's duration, and planned to be of educational value; the locality chosen was one of our most hilly districts, their actual centre being established on a hill at a height of 600 ft. above sea level, with a climb of 400 ft. from the valley below at the end of each day's tramp. Expeditions were undertaken daily, including the day of arrival and also that of departure. Breakfast was at 8 a.m. on most days, 6.30 and 7.30 on two occasions, and an early morning walk at 6.30 a.m. was part of Sunday's programme. The actual road distances covered each day was explained to me as being 5 to 7 miles, but the expeditions lasted the whole of each day, the time being well filled with sight-seeing and instruction. On two days, moreover, the walking for the bigger boys was increased up to 12 miles. In addition to excursions any available time was given over to football and games, for which provision was made on the spot, and those that know boys will be quite sure that such opportunities were not neglected. In short, it is obvious that the boys were subjected to considerable physical strain. At the same time the hours of sleep were decidedly insufficient; bedtime was 9 to 9.30 p.m. and lights were out at 9.45, but as the boys generally rose at 6 a.m. provision was made for but eight and a half hours' sleep.

The boys were medically examined ten days before starting, and were mostly well-built and sound. One was excluded for considerable cardiac dilatation, and is not included among the 40; 7 others showed heart-strain of a more moderate degree, and these went under the proviso that they be spared as far as possible; 33 were healthy boys with normal hearts.

Examined again five days after their return, 20 among the 33, or rather over 60 per cent. of these healthy boys, were found to show cardiac enlargement of various grades. This was, in most cases, no temporary condition, for at subsequent examinations at the end of two, four, six, and ten weeks, only a few of the hearts each time had returned to normal, and 10 of them (or 50 per cent.) still remained dilated two and a half months after the excursion. An interesting point was the age-incidence of these cases of dilatation. Of boys of 13 and 14 years, only 3.6 per cent. suffered; at ages of 10, 11, and 12 years 75 per cent. suffered; and among the youngest boys, at 7, 8, and 9 years, fully 83 per cent. were affected. With regard to the 7 boys whose hearts were already strained, in all but one there was an increase of dilatation in spite of restrictions.

In connexion with these results, the first inquiry must naturally be, What constitutes the normal outline of the heart in boyhood, and what variations from such a standard may be considered to lie within the limits of health? I have attempted to answer this question by careful measurements of the heart in 181 average schoolboys between the ages of 10 and 14 years.

Without going into details of this examination, I may say that in a large proportion the heart was found to extend from ½ in. within the nipple line on the left to a point on the right 1½ in. beyond the middle line of the sternum. This I take to be the desirable outline of the heart in boys of this age. A good many, however, showed 1¾ in. to the right and a left border about ¼ in. within the nipple line. This may, I think, be fairly included within normal limits, and 96 boys, or 53 per cent. of the total conformed to this not too rigid standard. All outside this should be considered, in my opinion, departures of some grade from the normal. In face of the enlargements brought about by expeditions such as that described, I do not think we are justified in using the term "infantile type" to describe a heart with the apex in the nipple line, as I find some authors do. There is abundant evidence to my mind that such conditions owe their origin to some past strain.

As a result of the expedition described an increase in the heart's width of ½ to 1 in. or more occurred. It is, of course, the deep dullness which corresponds to the heart's actual outline, and this is, in the young, easily and accurately obtained by light but firm percussion with a single finger. Where dilatation has occurred the heart not only becomes wider, but it comes nearer to the chest wall, so that some superficial dullness also appears to the right of the sternum and enlargement is obvious even to the most careless percussion.

To provide details of the dilatation which may result from school excursions I will turn to four subsequent expeditions in which more accurate measurements were made. Two of these led to slight results only, and of 51 boys only 16 showed appreciable dilatation; 11 of these 16 showed an increase of ½ in. and 5 of ¾ in. in the width of the heart's outline. The other two expeditions, on the other hand, gave a large percentage of strain; in addition to many with increase of ½ and ¾ in., 9 showed increase of 1 in., and 11 more of 1¼ to 1¾ in. in the cardiac dullness. In most cases the increase was both right and left, in a few to the right only. Where the dullness extended outside the apex beat on the left, it was presumed that the left ventricle was dilated, and in nearly all these cases there was also considerable enlargement of the right auricle on the right side of the sternum, and thus it seemed that the right heart suffered most markedly, and the left heart in only secondary degree.

We now proceed to inquire what disadvantages or dangers, if any, accrue from such dilatation as that described. That the enlargement is abnormal does not prove that it is pathological, for it may be compensatory. To decide this point we must consider what we believe to happen during muscular exertion and afterwards. During exercise the muscles demand an enormous supply of blood, and this, brought back to the heart, necessitates increased frequency of contraction to pass it on. After a time the

chambers dilate so as to accommodate more blood. I have observed this in boys at the end of a short race down and up stairs, when the heart's outline enlarges about ½ in. to the right, and also to a less extent to the left, though the apex retains its original position, or even moves somewhat inwards. The same increase of dullness may also be artificially produced by imitating the panting respirations of exertion; and this calls attention to another factor in filling of the heart's chambers with blood during exercise. The rapid and deep respiratory movements are of no small influence in their effect on the circulation, pressing the blood out of the abdominal organs, drawing it into the right side of the heart, storing it for a moment in the lungs, and then pressing it on into the left heart. Thus, as a result of several factors, the blood is crowded upon the heart and the heart enlarges, and surely such enlargement is compensatory; for when the increase of rapidity of the heart beat has reached the limits of efficiency, further demands can thus be met by increased output of blood. Enlargement implies healthy elasticity, and is not its loss an important factor in the narrowed reserve of those degenerated hearts whose cavities show no stretching? If, however, exertion is prolonged to fatigue the heart does not return to its normal size, and this may be due to a diminution of muscle tone. The study of tonicity of heart muscle is still in its infancy, but Gaskell has shown that one of the substances which diminish it is lactic acid. We know that sarco-lactic acid appears in the blood when, as a result of special stress on nutrition of muscles, such as occurs in severe exercise, oxidation is incomplete. Can we not ascribe cardiac dilatation, when this remains after severe exertion, to the effect of this lactic acid on tonicity?

If we assume that during exertion the heart's enlargement is compensatory, at any rate when exertion has ceased there is no more use for it. An abnormal quantity of blood in the heart's chambers during resting conditions appears to be disadvantageous only. Whether the whole quantity is passed on at each systole or not (and it has been proved that in these cases there is generally increased output), at any rate, the intraventricular pressure is raised, as was pointed out by Roy and Adami, and the heart muscle is given more work to do. The increased output leads to slowing of the pulse below that frequency which is physiological and hence most advantageous to the individual, and I think some of my boys showed this slowing. At any rate, many of those with cardiac enlargement had pulses of 60 to 64. It is obvious, then, that dilatation remaining after exertion has ceased means increased work and consequently a diminution in the reserve power of the heart. Such a condition must put the possessor at a disadvantage if illness or further strain follows, and, if it persists, will lead on to hypertrophy. Indeed, it is likely that hypertrophy is the channel through which the most marked cases lead to cure. Hypertrophy is not uncommon among boys of this age, though less common than among boys at puberty or somewhat later. Unexplained hypertrophy was present in 5 of the 181 boys from whom my physiological data were sought.

So much for the disadvantages of cardiac enlargement during rest; during exertion, on the other hand, with moderate enlargement it appears as if the resultant slowing of the pulse may be an actual advantage. In 5 boys whom I subjected to an exertion test before and after a school excursion, which had enlarged their hearts moderately, I found their running time and the respiratory rapidity were unaltered, but the pulse frequency was in all cases diminished at the second test. There was an average decrease of 18 beats a minute among these 5 boys. That this result was due to the cardiac enlargement is further suggested by a sixth boy, who showed no cardiac strain as a result of the excursion, and whose pulse frequency was precisely similar at the first and second test.

Sir Hermann Weber has described a fall of the heart's frequency on exertion as the result of a week or two's training in the Alps, though he does not suggest cardiac enlargement as an explanation. May I submit this suggestion? Where the heart empties itself during systole, as it seems to do in these cases, the defect must be one of tonicity alone. On the other hand, I have evidence that where dilatation is excessive this slowing of the pulse on exertion does not occur, pointing to a deficiency in contractility, which I should take as an indication for some enforced rest.

Most of these excursion boys appeared to be in good health and had few objective symptoms. Subjective symptoms I made no attempt to elicit. Some appeared to show a little blueness—a point on which I do not lay stress. A few showed slight respiratory distress, and three or four appeared to exhibit some muscular inco-ordination. On the whole it seems that boys with a moderate amount of cardiac enlargement, leading a life of average activity, appear in good health. From other experience, however, I may say that with more marked dilatation, or where strain continues, this is not the case. Loss of weight, loss of colour, depression and weariness, and all the train of symptoms and signs seen in cases of overpressure, assert themselves and may be difficult to remove.

I think, then, we have evidence on the clinical side that cardiac dilatation the result of strain in boys is harmful when it is considerable; we may also, I think, fairly conclude on physiological grounds that even the slighter degrees are undesirable where they are persistent. I would not, however, press too far the importance of these slighter cases. It is now my purpose to consider very shortly how strain may best be avoided.

The natural activity of the young may fairly be considered as an activity of short spurts, followed by periods of comparative but not complete rest. Moreover, it is natural for boys of fairly equal age and physique to hang together, keeping the odds fairly balanced in such competition as may exist. In holiday excursions, in scouting, and other conditions which lead to strain, these natural laws are violated. Boys of various ages and strength are, as a rule, mixed, and the standard of exertion is planned according to the wisdom or unwisdom of a fully grown adult. These are the conditions which need revision if strain is to be eliminated. In one of my holiday excursions where a strenuous programme was carried out I was surprised to find that comparatively little cardiac strain had resulted. On further inquiry light appeared when the principles enforced in this expedition were explained to me. These were "short tramps" with rests of equal length between, and frequent small drinks of water. Here the long grind so unnatural to youth was avoided, and perhaps the small drinks prevented concentration of fatigue bodies in the blood. The result was certainly surprisingly successful, and suggests the lines on which such expeditions might be more safely carried out. It should certainly not be the aim of our profession to put obstruction in the way of such excellent institutions as holiday excursions for boys; it should be our aim rather to instruct the teaching profession in the means by which they may be carried through without harm.

In the first place, it is obvious that the programme must be mapped out with an eye to the weakest members of the party. Secondly, boys of fairly equal age and endurance only should be put together, so that all unnatural competition may be eliminated. Such selection, to be of any worth, necessitates a medical examination; but, fortunately, this need be no bar in the future, since medical inspection is now a feature of all State schools and of most enlightened schools provided for the moneyed classes. In the third place, the conditions of life during these expeditions should be arranged with a view to boyish needs. Abundant sleep must be supplied, and all expeditions must be on the principle of short tramps with frequent rests between. If, by such simple means, physiological laws are appeased, I see no reason why cardiac enlargement of any but slight and temporary grade need ever occur as the result of holiday excursions or of other expeditions of similar nature.

ADMINISTRATION OF OXYGEN IN HIGH PERCENTAGE.

By BENJAMIN MOORE, M.A., D.Sc.,

Johnston Professor of Bio-chemistry, University of Liverpool.

THE usual methods of administering oxygen by delivering it from a steel bottle in a constant stream into a tube or funnel or open mask are so wrong in principle as to be practically useless, and it is questionable whether the patient ever gets a mixture containing more than a few

per cent. of oxygen above the atmospheric amount, nearly all the oxygen escaping into the air of the room.

The nature of the respiratory process is such that the patient does not require a continuous stream of oxygen bubbling out at or near the mouth; but rather a plentiful reservoir to breathe from rapidly each time he draws his breath. An apparatus based on this principle for continuous administration of a high percentage of oxygen is exhibited. It consists of a collapsible holder, or gas-bag, sealed off from the air below by a water seal, and having in its base four large circular trays containing lime slaked with caustic soda for uptake of carbon dioxide during the breathing. The bag is first filled with oxygen, either made from potassium permanganate, or obtained from a steel gas cylinder. The patient then simply breathes backward and forward into the bag through an airtight mask and a very wide tube. There are no valves to obstruct the breathing, and the carbon dioxide is completely taken up by the soda lime. No discomfort whatever is felt in using the apparatus, nor any difficulty in breathing.

A CASE IN WHICH PNEUMATURIA WAS APPARENTLY THE SOLE INDICATION OF GLYCOSURIA.

By FRANK C. EVE, M.D., M.R.C.P.,
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IN the following case the point to which I chiefly want to draw attention is the interesting problem presented—namely, Can sugar in the urine be entirely converted into acid and gas by bacilli in the bladder?

The patient was a middle-aged, well-to-do man of Jewish nationality, with gouty tendencies but of very abstemious habits.

For four years he had suffered from painful and frequent micturition, associated with pus and mucus in the urine and pain in the loins. Sometimes this made him very ill, and kept him in bed for weeks.

After seeing many doctors he consulted Mr. Hurry Fenwick in London, who diagnosed right ascending pyelitis from *Bacillus coli* infection, presumably from an attack of appendicitis seven years before. He advised operation, unless autogenous vaccine treatment was successful. At Dr. Briggs's request I carried out this treatment with large doses, beginning at 60 millions and increasing to 300 millions every ten to fourteen days. Improvement was marked on the larger doses. But about this time he casually mentioned that he often passed bubbles of gas at the end of micturition.

This I interpreted as being the handiwork of the *Bacillus coli* on sugar, in spite of there never being any sugar in the urine. In support of this supposition, the doctor who attended him seven years ago told me the patient often had sugar in the urine, but no cystitis, in those days.

Acting on this hint, I put him on an antiglycosuric diet. This was a decided success, and confirmed my suspicions of masked glycosuria.

With vaccine, diet, helmitol, and alkalis the patient made an excellent recovery, and after six months reports himself as feeling "quite fit," and he looks it. However, there are still some living bacilli in the urine. Albumen has been practically absent, so that this could scarcely be the source of the pneumaturia (Vide Adrian and Hamm, *Mitteil. grenzgeb. der Med. u. Chirurg.*, 1907, xvii, pp. 10–56).

I attacked the problem stated in the opening sentence of this paper in the following ways:

It is known that in the presence of proteids *B. coli* splits up glucose into gas (CO_2 and H), acetic and lactic acids and alcohol. Will the same change occur in urine in the absence of proteid? The answer is Yes, for I found that a standard culture of *B. coli* grew abundantly with gas production in non-albuminous diabetic urine.

But to my surprise I found that the patient's variety of *B. coli* could not be induced to produce gas either in urine or liquid culture media, either with glucose or any other sugar. This seemed not only fatal to the theory, but also made it difficult to give a name to the organism. I applied in my trouble to Dr. Houston, of the London Metropolitan Water Board Laboratory, who has immense experience of *B. coli*. He very kindly sent me five tubes demonstrating that the bacillus is really a gas producer in five different sugars, and said that his gelatine method often succeeded where the ordinary liquid method failed. He also told me that *B. coli* often produces gas in three hours.

Hence, though I have not proved it, I have shown that it is possible, and even very probable, that sugar in the urine may be quickly destroyed by an accompanying colon bacilluria and be recognizable only as pneumaturia. Typhoid bacilluria would be even more effective in cloaking glycosuria, for it would split up the sugar into alcohol and acids without gas formation.

My patient's bacillus was not a typical colon bacillus, but approached the typhoid type in its very feeble power of gas production. Hence, I have little doubt that it often fermented sugar into lactic and acetic acids and alcohol in the bladder without revealing itself by gas production. (My patient often complained of the smarting of the acid urine.) These irritating bodies would aggravate the cystitis and pyelitis, while the undetected sugar would give abundant and welcome nourishment to the half-starved microbes we are seeking to exterminate.

The practical moral of this case (if my contention be true) is that in any patient with germs in the urine it is necessary to look out for oblique evidence of glycosuria, because, if undetected and untreated, the sugar will militate strongly against success in treatment by nourishing the germs and irritating the bladder by decomposition products.

I am conscious that my paper is not quite conclusive, and that it raises a complicated question rather than settles it.

My thanks are due to Drs. A. E. Garrod and Upcott for kind help.

THE INFLUENCE OF SOIL ON PHTHISIS AS ILLUSTRATING A NEGLECTED PRINCIPLE IN CLIMATOLOGY.

By WILLIAM GORDON, M.A., M.D.Cantab., F.R.C.P.Lond.,
Physician to the Royal Devon and Exeter Hospital.

THERE is a principle in climatology which has been singularly neglected—if, indeed, it has ever been quite definitely recognized—yet whose importance, once indicated, is surely obvious. I will call it *the principle of approximate isolation of influences*. By such "approximate isolation" I mean, not the elimination of only one or two influences in the investigation of another influence, but the systematic enumeration of *all* the known influences which may affect the conditions investigated, and their successive elimination, so far as that is possible. I shall try to illustrate the application of this principle in these notes on the subject of soil and phthisis.

There is a general impression that the question of the relations of soil and phthisis has been definitely settled. That is a mistake; the objections to Buchanan's work have never been answered. The figures I am going to place before you are far too small to aspire to settling it; but I hope that they may serve to indicate the lines along which a settlement may be reached.

I.—AN OPEN QUESTION.

Buchanan's First Report.

In 1865 and 1867 Sir George Buchanan published the two statistical reports[1] which form all the important evidence we possess in favour of the theory that damp soil increases phthisis prevalence. Starting from the observation that the phthisis death-rate of Salisbury had fallen to about half in about fifteen years, coincidently with very efficient drainage of the subsoil, Buchanan investigated the changes in the phthisis death-rate of twenty-three other towns where drainage works had also been carried out. He found that in eighteen of these towns more or less drying of the subsoil had been effected, and that in fourteen of the eighteen the phthisis death-rate had coincidently greatly declined. There were however, marked exceptions.

Buchanan's Second Report.

He next examined the distribution of phthisis in the registration districts of Kent, Surrey, and Sussex during the ten years 1851–60. These districts, when arranged in ascending order of phthisis death-rate, were found to stand also in approximate order of increasing dampness of soil and, when only specially comparable districts were considered, the correspondence between death-rate and dampness seemed to become clearer. Here again there were marked exceptions.

Milroy's Figures.

About the same time Dr. Milroy[3] found, in eight great towns of Scotland, that Leith and Edinburgh, on the driest soil, had the least phthisis, whilst Glasgow and Greenock, on the wettest soil, had the most.

Kelly's Objections.

Buchanan's conclusions were, however, soon challenged. Dr. Kelly, Medical Officer of Health for West Sussex, showed[3] that for the years 1861 to 1870 and for 1875 to 1879 the order of the districts of West Sussex, in respect of phthisis death-rate, was different from that found by Buchanan for 1851 to 1860, and that the death-rates of all the districts of West Sussex had considerably declined, although, in point of dampness, the subsoil had remained the same. He also pointed out the marked general decline in phthisis mortality in progress all over England, which Buchanan had overlooked in his first report.

Other Objections.

Also in 1879 Droeze stated that in Holland the elevations with diluvial soil suffered more from phthisis than the depressions with alluvial soil;[4] Reck found that in Brunswick the phthisis death-rate was not greater in the wet quarters of the town than in the dry;[5] Lieven showed that in Dantzig the death-rate had actually risen after drainage;[6] and it was observed in Berlin[7] that no notable effect on phthisis followed the drainage of the city.

To all these serious objections no answer has been given.

The Influence of Wind.

I must here digress for a moment to refer to an influence which Buchanan was not aware of—that of wind. Haviland first drew attention to the effect of wind exposure in 1868,[8] but he attributed it to *any* strong prevalent winds, "whencesoever they came";[9] and, as it can be readily shown that dry winds exert very little, if any, influence on phthisis prevalence,[10] his excellent work has been too much forgotten. During the past ten years, however, the influence of strong, prevalent rainy winds on the prevalence of phthisis has been investigated by me in several separate districts of Devonshire[11] and in Exeter streets[12] over periods of ten years, over periods of various lengths in many different parts of the world,[13] and, in conjunction with Dr. Harper, Medical Officer of Health of Barnstaple, in twenty-three parishes of North Devon over a period of forty-five years;[14] in all of these inquiries the same result has been reached—namely, that populations exposed to strong, prevalent rainy winds have a higher death-rate from phthisis than populations sheltered from them. To these results only the flimsiest objections have been raised, and they have been all answered. No counter-evidence of any value has been adduced.

The importance of the influence of wind in connexion with that of soil on phthisis prevalence is that it is stronger. Haviland observed this.[15] I found that when Exeter streets were arranged in ascending order of phthisis death-rates, no relation to soil was obvious, but that, when only those streets were considered whose roadways were sheltered from the rainy winds, a relation to soil became at once discernible.[16] Again, in Newton Abbot and St. Thomas Rural Districts, no influence of soil was discoverable until only sheltered parishes were compared with each other.[17] This greater potency of wind influence was a disturbing factor in Buchanan's work, which he felt but could not account for,[18] and has to be taken into consideration in all that has been written on the subject of soil.

Criticism of Buchanan's Work and Milroy's.

One can now fairly criticize Buchanan's work. Taking his second report first, the table of ascending phthisis death-rates better illustrates the effect of wind than the effect of soil.[19] If his specially comparable districts are compared, after exclusion of those which he himself regarded as exceptional, and of those which are specially exposed to S.W. winds, they do not indicate, as I have elsewhere shown, a very pronounced influence of soil.[20] Moreover, Buchanan chose areas of too large a size (registration districts), nearly all of them of composite geological structure, thus sacrificing precision of soil distinction to population and extent. He failed, lastly, to allow satisfactorily for occupation, density of population, and for imported cases in the health resorts. His second report, therefore, in view especially of Kelly's objections to it, cannot be accepted as conclusive. With regard to his first report, when allowance is made for the average general fall in phthisis death-rate already in progress over the whole country, the declines in death-rate of the towns investigated become smaller and fewer and the exceptions greater and more numerous. Again, it is difficult to attribute in some cases the very considerable decline in death-rate to the very inconsiderable amount of drying shown, and, except in the case of Salisbury, I do not see how the immense changes in the conditions of life, made coincidently with the drying of the subsoil, such as removal of great insanitation and overcrowding, can be set aside in the way in which Buchanan sets them aside. Therefore, although the single case of Salisbury strikes one as exceedingly suggestive, this report also cannot be looked upon as conclusive.

Milroy's figures may merely illustrate the influence of wind.

Criticism of Buchanan's Opponents.

In thus criticizing Buchanan's work it is necessary to also criticize those who have raised objections to it. Kelly, like Buchanan, was unaware of the effects of wind, although he almost hit upon them.[21] His units of area—parishes—were of better size than Buchanan's, but his period of observation—five years (1875–9)—was too short, as my experience proves. His objections to Buchanan's results cannot on these grounds be set aside, but they do not suffice to dispose of Buchanan's theory.

On the other hand, if the Dutch figures are correct (and Clemow thinks the Dutch phthisis statistics are specially unsatisfactory),[22] they, like Milroy's, may be accounted for simply by wind exposure. The Brunswick and Dantzig reports quoted by Hirsch are destitute in his work of much necessary supplementary information, and in Berlin the death-rate did actually fall, although but slightly.

Conclusion.

Thus, except Kelly's, there are no objections which are of any consequence, and even his work must be regarded as unsatisfactory.

In short, Buchanan's theory is neither proved nor disproved, and the question of the relation of soil to phthisis remains an open one.

II.—Soil and Phthisis in Devonshire.

Turning now to the extremely limited observations I have made on the relations of soil and phthisis in Devonshire, I propose to consider soil as it affects phthisis prevalence in the streets of Exeter and in a number of country parishes. In Exeter the nature of the subsoil of each street is exactly known, and will be stated as gravel, sandstone, and clay (made soil being excluded because of its varying and uncertain composition). In the country parishes the geological formation in each will be given, and care will be taken to avoid parishes in which the dwellings are placed where the slope is so slight as to suggest imperfect drainage.

Elimination of other Influences.

The influences, other than soil, which are at present known and may be reasonably supposed to affect the prevalence of phthisis in Devonshire are:

Winds (strong, prevalent, and rain-bearing),
Altitude,
Rainfall,
Density of population,
Poverty,
Occupation,
Insanitation,
Race,
Closeness of intermarriage;

and as affecting the statistics,

Date of observation.

These I shall deal with thus:

Wind and *date of observation* can be at once eliminated by only considering sheltered populations and contemporary records.

Altitude, race, and *closeness of intermarriage* may be neglected, since I have found no evidence of their exer-

cising any influence in Devon, except that, in exposed situations, altitude seems to aggravate the effects of exposure.

Insanitation may also be set aside, because in Exeter streets and in Devonshire rural districts no relation is discernible between general death-rate and phthisis death-rate. Moreover, in the country parishes the results of inquiries indicate no important differences in sanitary conditions.

Occupations in the country villages do not appreciably differ, and in Exeter there is no large injurious industry which could exert a considerable effect.

Three other influences remain to be considered.

Rainfall in Exeter may be regarded as uniform and neglected. But in the country parishes it varies greatly; therefore the probable rainfall will be stated for each parish; it will be found not to cause difficulty.

Poverty and *density of population* cannot here be separated. In the country parishes these conditions are, I believe, too uniform to affect the figures. But in Exeter they must be taken into account; accordingly the average rateable values of the inhabited houses will be stated for each street. No insuperable difficulty will, I think, be found in eliminating these influences.

In the Streets of Exeter.

Table I gives the streets of Exeter whose roadways are sheltered from S.W., W., and N.W. winds, arranged in ascending order of female phthisis death-rate over 5 years of age (calculated, however, not on the female populations alone, which were not available, but on the total populations). In a parallel column are placed the average rateable values of the inhabited houses in each street. A glance over this table, I would submit, suggests a relation between soil and phthisis, the lower death-rates being on generally more pervious soils, but does not suggest any marked correspondence between phthisis death-rate and rateable value. A closer examination, however, does indicate a definitely lower death-rate in streets of rateable values over £20. For, by comparing all death-rates under 0.5 per 1,000, and all of 0.5 per 1,000 and over, we obtain Table II.

TABLE I.—*Female Phthisis Death-rates in the Sheltered Streets of Exeter, from 1892 to 1901.*

Name of Street.	Female Phthisis Death-rate (over 5 years of age) per 1,000 of Total Population per annum.	Soil.	Rateable Value of Inhabited Houses in £ per annum.	Total Female Deaths from Phthisis over 5 years of age. 1892 to 1901.	Total Population, Census 1901.
Springfield Road ...		Clay ...	10-15		208
Haldon Road ...		Shillet ...	25-30		189
Codrington Street...		Clay ...	8-10		160
Waterbeer Street ...		Sandstone	8 and under		147
Ewings Street ...		Gravel ...	8 and under		127
St. Sidwell's Avenue		Sandstone	10-15		119
York Road		Sandstone	over 30 ...		108
Albert Street ...	0	Clay ...	8-10	0	104
Goldsmith Street ...		Clay ...	25-30		98
Guinea Street ...		Clay ...	8-10		76
Gandy Street ...		Clay ...	20-25		66
Centre Street ...		Gravel ...	8 and under		51
Bear Street		Clay ...	8 and under		39
George Street ...		Sandstone	10-15		26
John Street		Sandstone	over 30 ...		14
Well Street	0.2	Sandstone	8-10	1	450
Cheeke Street ...	0 2	Clay ...	8 and under	1	353
Longbrook Street ...	0.2	Clay ...	20-25	1	335
Hoopern Street ...	0 3	Clay ...	8-10	1	316
Frog Street	0 4	Gravel ...	8 and under	1	229
Paris Street... ...	0 5	Clay ...	10-15	6	1,024
Culverland Road ...	0 5	Clay ...	10-15	3	179
Belgrave Road ...	0.5	Clay ...	8 and under	1	171
Russell Street ...	0.7	Clay ...	8-10	3	398
Market Street ...	0.7	Clay ...	10-15	1	127
Belmont Road ...	0.8	Clay ...	20-25	2	230
King Street	1.2	Sandstone	8 and under	2	163
Chute Street... ...	1.7	Clay ...	8-10	3	168

TABLE II.

Rateable Value of Inhabited Houses in £ per annum.	Population with Female Phthisis Death-rate under 0.5 per cent. per 1,000.	Population with Female Phthisis Death-rate of 0.5 per cent. per 1,000 and over.	Total
£8 and under ...	946	334	1,280
£8-10	1,076	566	1,642
£10-15	353	1,350	1,703
£20-25	401	230	631
£25-30	287	—	287
Over £30	122	—	122

Here, however, if we exclude the streets with rateable values of £20 and over, there is no indication that poverty increases the phthisis death-rate, the indication apparently being the other way, doubtless because the poorer streets are so often on the more permeable soils. Confining our attention, therefore, to streets with rateable values up to £15 only, we obtain Table III, giving us the relation of soil in these streets to phthisis death-rate.

TABLE III.

Soil.	Total Population.	Female Phthisis Death-rate.
Gravel	407	0.24
Sandstone	905	0.33
Clay	3,423	0.55

Although these populations are very small (especially when it is considered that the female deaths have had to be calculated on the total populations), the conclusion that here soil does really influence phthisis death-rate seems to me difficult to explain away.

In the Country Parishes.

Next let me turn to the country parishes. Table IV gives these parishes grouped according to the geological formations on which the villages stand, the probable rainfall being also given for each. In some cases, a few houses are built on other formations, and these are as follows: In Ashcome, Dunsford, and Ilsington a very few houses are on alluvium. In Ide some houses stand on alluvium and millstone grit. In Bridford and Christow some are built on granite; in Bridford a few are also on river gravel. In Lustleigh some are placed on millstone grit. Otherwise the formations lived on are uniform, except the Devonian. Devonian is, strictly speaking, a composite formation. My justification for not subdividing it is that, whether from steepness of slope or perviousness of material, or some other reason, it seems to be generally associated with a relatively low phthisis death-rate, not merely in Devonshire but throughout Great Britain.

Here the effect of rainfall has first to be considered. In one sense it need not really be eliminated, for its influence, if any, on phthisis in shelter from wind may well be explained by its making the soil more or less damp. Still, it is better to try to gauge its share in the result. The villages on permian conglomerate, with lowest phthisis death-rate, have probably the lowest rainfall; but the villages on Devonian, with a higher rainfall, have also a very low death-rate. On the other hand, the

TABLE IV.—*Phthisis Death-rates per 1,000 per Annum in Parishes Sheltered from S.W., W., and N.W. Winds, 1890–1899.*

Name of Parish.	Population, 1891.	Deaths.	Rate per 1,000.	Probable Rainfall.
Villages on Permian Conglomerate or Sandstone:				
Ashcombe	167	0	0	About 40 in.
Mamhead	158	0	0	,, 40 ,,
Ide	648	1	0.15	,, 35 ,,
	973	1	0 10	
Villages on Devonian:				
Bittadon	46	0	0	,, 50 ,,
Brendon	294	0	0	,, 45 ,,
High Bray	226	2	0.8	,, 55 ,,
Challacombe	226	1	0.4	,, 65 ,,
Trentishoe	96	1	1.0	,, 45 ,,
Berrynarbor	652	2	0.3	,, 40 ,,
Arlington	238	0	0	,, 53 ,,
East Down	346	1	0.2	,, 50 ,,
	2,124	7	0 32	
Villages on Millstone Grit:				
Dunsford	665	1	0.15	,, 38 ,,
Bridford	429	3	0 7	,, 38 ,,
Christow	567	4	0.7	,, 38 ,,
Doddiscombsleigh ...	250	0	0	,, 38 ,,
Ashbury	69	0	0	,, 45 ,,
Tawstock	1,206	9	0.7	,, 40 ,,
Ilsington	1,000	5	0.5	,, 50 ,,
	4,117	22	0.53	
Villages on Granite:				
Widecombe	744	7	0.9	,, 60 ,,
North Bovey	417	3	0.7	,, 50 ,,
Lustleigh	415	1	0.2	,, 50 ,,
Gidleigh	129	0	0	,, 50 ,,
Throwleigh	231	3	1.0	,, 50 ,,
	1,986	14	0.70	

villages on shale, with an intermediate rainfall, have a higher mortality than either; whilst the villages on granite, where the heaviest mortality obtains, have probably not much more rain than those on Devonian. It is, therefore, at least clear that the rainfall alone will not account for the differences in the death-rates, and thus here again it seems difficult to escape from the conclusion that these differences are really dependent on differences in the soil.

CONCLUSION.

I am perfectly aware of the defects of these very limited figures and, as I have said, I do not dream of basing any final conclusions upon them; the method I have tried to illustrate necessarily greatly limits the material available for investigation. Other influences also may exist of which we are now ignorant. But if I have satisfied you that the lines I have indicated hold out a better promise of reliable results in the future than those which have been hitherto followed, I think I shall have justified the inroad I have made upon the valuable time of the Section.

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THE GASTROSCOPE AND ITS USES.

BY

HENRY S. SOUTTAR, B.M., B.Ch.Oxon., London Hospital.

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[*With Special Plate.*]

I.—DESCRIPTION OF THE INSTRUMENT.

By Dr. SOUTTAR.

IT is now nearly three years since we first attempted to solve the problem of gastroscopy. For the first twelve months we worked in the dark—literally, for no ray of light ever reached us through the primitive contrivances which we hoped would one day develop into gastroscopes. At the end of that time we were rewarded, and saw the gastric mucous membrane for the first time. Yet those early tentative experiments were, I think, well directed, and taught us much of the anatomical and mechanical difficulties which we had to face. I therefore make no apology for describing the method we pursued.

We considered it axiomatic that a gastroscope must consist of a series of jointed segments, so constructed that during passage it should be flexible, but that when in position the segments could be locked together into a rigid tube. In this we were wrong, as I shall show later, but I still think that this was the best and safest way in which to attack the problem. Experiments on the cadaver proved futile; the stiff jaw, the rigid spine, and the flaccid oesophagus made the passage of instruments difficult and the results misleading. We therefore had to be content with mere measurements from the cadaver and to carry out our actual experiments on the living. This of course meant that we had to proceed by very short steps and with scrupulous care, taking every precaution that consideration could suggest.

Two questions met us at the outset: (1) What is the normal form of the oesophagus? and (2) To what extent can it be straightened? To answer these we passed metal-lined bougies and examined their shadow on a fluorescent screen by means of *x* rays, the subject meanwhile bending his back and moving his head in various directions. We then constructed a metal bougie cased in rubber, and made of several short segments of metal tube so connected together that the whole formed a flexible rod which could, after introduction, be rendered rigidly straight. We found that this bougie could be passed and straightened when *in situ* without inconvenience to the patient. In order to make absolutely certain of this very important point we first tried the experiment upon ourselves. It was then clear that, in spite of the intimate relation of the oesophagus to the heart and other important viscera, the oesophagus would tolerate a straight rod reaching from the fauces to the cardiac orifice of the stomach, and 15 mm. in diameter.

Beyond the cardiac orifice such a straight rod cannot be carried, for it will impinge directly on the lower dorsal vertebrae where their bodies form the lower portion of the dorsal concavity. The lower end of our instrument was therefore bent forwards at an angle of 30 degrees. The nose of the instrument was thus brought clear of the spine, and into the lumen of the distended stomach. At the upper end an oral portion was added at an angle of 60 degrees with the oesophageal limb. It thus projected conveniently from the mouth with the head in a natural position.

Thus, with only two angles, we had laid down the outlines of a gastroscope which, when in position, would conform exactly to anatomical requirements and throw no undue strain on any structure. One other question remained. Could such an instrument be passed? At first sight, the forward tilt of the beak would seem to render its passage in such a perilous neighbourhood a most dangerous proceeding. As a matter of fact, this lower angle is the

safeguard of the instrument. When it is to be passed, the head and neck are brought well forward, and the dorsal concavity is thus accentuated and its curve continued into the cervical region. The angular instrument will now fit snugly into this concavity, instead of lying across it as would happen were it straight. As the instrument descends, the head and neck are allowed to fall back, and the dorsal curve is so far reduced that behind the straight middle portion of the instrument it is inconsiderable. As a matter of experience, we have never had the slightest difficulty either in passing the instrument or retaining it in position, and no ill effects from its use have been observed.

The results I have thus briefly sketched were only obtained by laborious work and after repeated failures. The technical difficulties in the construction of the instruments themselves were very great. Fortunately, I was able to make them entirely myself, but six complete instruments were made before we reached a practicable form. A seventh was made for us in Berlin, and an eighth I have again made myself embodying certain technical improvements. The expenses have been very considerable—the Berlin instrument alone cost £60; and I most gratefully acknowledge the generous help we have received from the Trustees of the London Hospital Medical College Research Fund. Without their aid our progress would have been very seriously hampered. This last instrument is much simpler than any of its predecessors, and I propose briefly to describe its construction.

In the language of morphology, we may describe it as a tubular structure whose wall is formed of three layers—an outer protective, a middle supporting, and an inner transmitting layer. These layers remain distinct through the whole length of the instrument, and each must be described in turn.

The outer layer consists of a moulded steel tube, and is in two portions united by a very substantial joint. The whole forms a sheath of very great strength and rigidity, absolutely watertight and effectively protecting the delicate mechanism it contains.

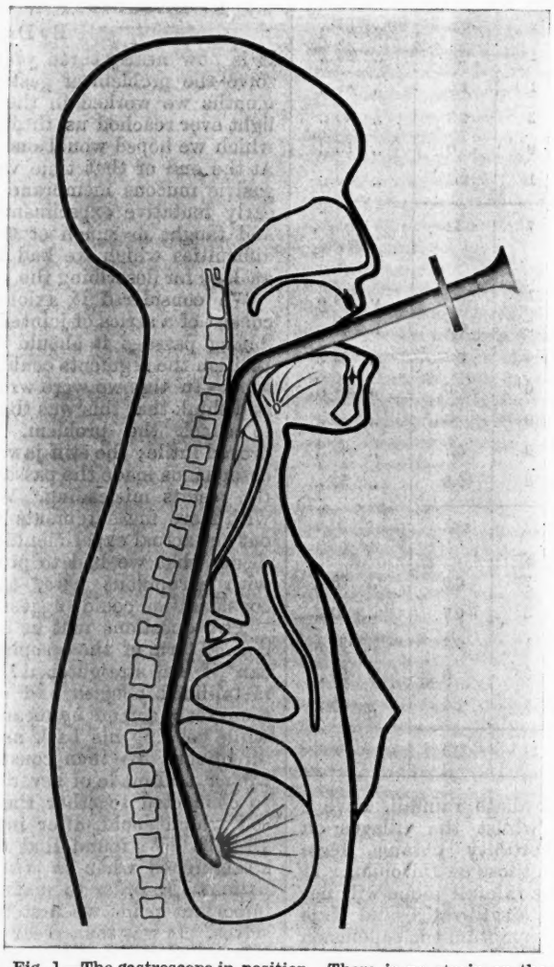

Fig. 1.—The gastroscope in position. There is no strain on the neck or on the oesophagus. The lower angle carries the nose clear of the spine.

The middle layer consists of two metal tubes coated with silk and introduced into the two portions of the outer sheath before these are united. These tubes carry at their ends the two mirrors which are necessary at the angles of the instrument. Their silk covering insulates them from the outer sheath, and thus a means is provided for carrying electric current to the lamp in the nose-piece.

The inner layer consists also of two tubes. These can rotate freely inside the middle layer, and being provided with gear teeth, rotation can be transmitted by their means from the eye end of the instrument to the nose-piece. These internal rotating tubes surround the above-mentioned mirrors which thus lie within their cavity. The exact method by which the mirrors are supported in this difficult position is clearly shown in the diagrams.

Into the details of the intricate optical problems involved I do not propose to enter. I will merely point out that light from the stomach wall, falling on the small window in the side of the nose-piece, is reflected immediately by a mirror behind that window of the tube, and through a lens of very short focal length. This lens forms inside the tube a minute image of a very large field. The light from this image, after reflection at the mirrors at the two angles of the instrument and refraction at another lens, forms a small image near the eye end. This last image is examined by an eye-piece, and the net result is that a very large area of the stomach wall is seen at one time and of about its natural size. Rotation of the nose-piece will make the window face in any direction. By rotation of the instrument as a whole, the nose-piece can be deflected to either side of the stomach. Finally, by a combination of these two movements, the operator can sweep practically the whole inner surface of the stomach.

In order to see the stomach wall, it is essential that the stomach should be inflated with air. This is done after the introduction of the instrument by pumping air in at the nozzle near the upper end. The air is conducted down the central cavity of the instrument, and emerges through a small aperture at the lower end covered by a rubber band.

The method of using the gastroscope is as follows: The stomach is, if possible, empty, and shortly beforehand it is washed out by means of a tube. The patient is preferably under an anaesthetic, lying on a flat table with a low pillow beneath the shoulders to assist in flattening the dorsal curve. The anaesthetist now props the mouth open with a Mason's gag, and lifts the head forwards without any tilt at all. A full-sized bougie is now passed as a precaution, and after its withdrawal the nose of the instrument is guided carefully into the pharynx by the finger. At the cricoid cartilage, some resistance is always met from tilting of the cartilage and from spasm of the upper end of the oesophagus. Gentle manipulation soon enables the instrument to pass, and it is now allowed to glide by its own weight down the oesophagus. Slight spasm is again met with at the cardiac orifice, and is useful as indicating the instant at which the nose enters the stomach. As the instrument glides down, the head is gradually allowed to fall back again, thus avoiding undue strain as the oesophagus becomes occupied by the straight limb. The pump is now attached and the stomach inflated, whilst an assistant percusses out its lower border and thus gauges the degree of dilatation. The light is now switched on, and the nose rotated and deflected till the whole mucous membrane has been systematically examined.

The passage of the instrument and its subsequent manipulation are, of course, delicate proceedings, and demand a certain amount of manipulative skill, but not more than is required by a cystoscope. With reasonable care the proceeding is entirely devoid of danger.

Dr. Thompson will describe what we have already seen with our instruments. We have, however, hitherto aimed rather at perfecting the instrument than at examining cases. We felt that it was our first duty to place in the hands of the profession a reliable gastroscope based on sound mechanical and anatomical principles, not easily

deranged, so that it could be used with confidence and success by any one with ordinary skill and care. In this, I think, we have succeeded. Future experience will, I hope, suggest many improvements, but I do not think that it will greatly modify the general lines of the gastroscope which I have described.

II.—RESULTS OBTAINED BY GASTROSCOPY.

By THEODORE THOMPSON, M.D.,
Assisiant Physician, London Hospital.

BEFORE giving an account of the results achieved by the use of the instrument I feel I must express my thanks for the assistance afforded to us by the London Hospital Endowment Fund for Medical Research. The preparation of the very complicated instrument which Dr. Souttar has so clearly described not only demanded infinite patience and mechanical genius, but was also extremely costly, and

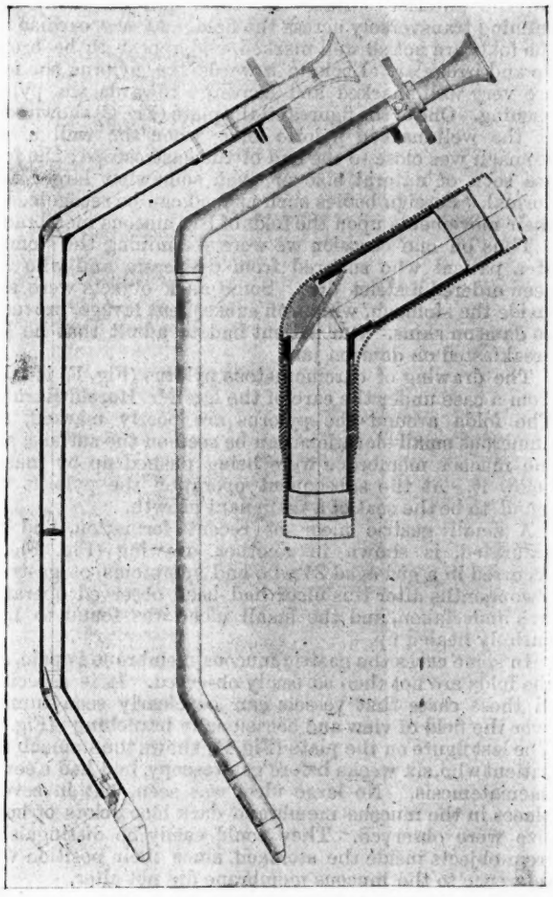

Fig. 2.—Mechanical and optical details.

we have to thank this Endowment Fund of the London Hospital for coming to our aid in this matter.

It can fairly be said that the introduction of the cystoscope produced almost a revolution in the treatment of genito-urinary diseases, and it was the success of workers in this field which led us to attempt the direct inspection ef the gastric mucous membrane without resort to laparotomy.

The importance of this subject is shown by the multitude of workers who have devoted themselves to the early diagnosis of the graver disorders of the stomach. The result of their work has been to modify many of the data formerly relied upon for diagnosis, and the subject, instead of becoming simpler, has rather increased in complexity. The two common diseases of the stomach in which early diagnosis is imperative are carcinoma and ulcer, and in many cases the failure of the present methods of examination is notorious. In fact, the physician in an early case may often be in doubt whether he is dealing with a malignant growth, an ulcer, or merely a functional disorder of the gastric mucous membrane.

The pathogenesis of a gastric ulcer is still far from being definitely known, and there can be no doubt that our instrument will be of service in elucidating this point. The scars found in the stomachs of patients who have died of other diseases points to the fact that there is a natural cure of gastric ulcer. It will be our duty to see how far medical treatment can aid this natural process of cure, and to endeavour to ascertain what conditions are unfavourable to the healing of an ulcer.

In gastric carcinoma we have a form of new growth which for some time remains localized to the stomach, and could the condition be recognized early, surgical interference might lead to much more favourable results than are at present secured. In many cases the diagnosis is not made until a tumour can be palpated, and it is now known that when the disease has progressed thus far the lymphatic glands have almost invariably become infected. Consequently it is imperative that carcinoma of the

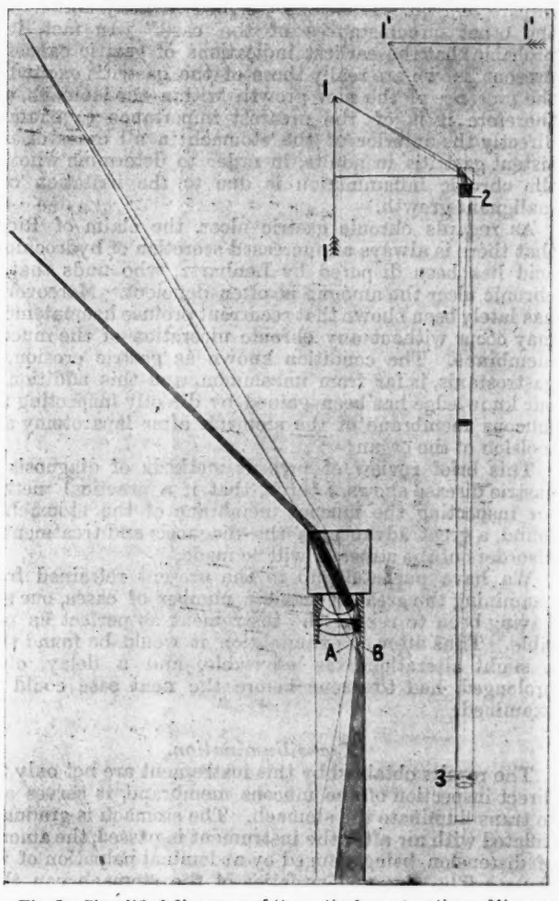

Fig. 3.—Simplified diagrams of the optical construction. Mirrors are omitted, and in the larger the reflecting prism is replaced by a glass cube. The figures indicate respectively: 1 1, the stomach wall; 1' 1', the reflection in the reflecting prism; 2, the small image formed by the short focus lens close to the prism; 3, the larger image formed close to the eye-piece, through which it is viewed. The larger drawing shows in more detail the construction of the short focus lens. Two pencils of light have been calculated and drawn to show the extent of the field of view. They converge respectively to the points A, B in the first small image (2).

stomach should be diagnosed before the tumour becomes palpable.

It was at one time thought that the chemical examination of the gastric juice would furnish a certain clue to the diagnosis of gastric disorders. Dr. Golding-Bird first noted that the secretion of hydrochloric acid was greatly diminished or absent in many cases of carcinoma of the stomach. Recently, however, many cases of undoubted carcinoma of the stomach have been recorded in which the amount of hydrochloric acid in the test meal was either normal in amount or actually increased, and it seems probable that the absence of hydrochloric acid is due rather to the accompanying gastritis than to the carcinoma itself. Thus, in an early case of carcinoma ventriculi observed some years ago by the authors, hydro-

chloric acid was absent when the patient was admitted to hospital, but, under careful treatment, all symptoms disappeared and examination of the test meals gave a normal content of hydrochloric acid. The case was thought to be one of gastritis and was discharged apparently cured, only to return in three months' time with a large nodular liver. At *post-mortem* examination a small growth was found in the stomach with secondary deposits in the liver. Had we possessed a gastroscope at the time of his first admission, a correct diagnosis would have almost certainly been made in time for successful operative interference.

Moreover, the problem has become more complex since the work of Moore and Palmer, who have shown that carcinoma in parts of the body other than the stomach leads to a great diminution in the amount of hydrochloric acid in the gastric juice. Consequently, we must accept the conclusion of von Jaksch and Garrod that "the presence or absence of free hydrochloric acid in cases of carcinoma of the stomach is a symptom of doubtful import, and that it must be weighed in conjunction with the other circumstances of the case." In fact, it is probable that the earliest indications of gastric cancer at present known are really those of the gastritis excited by the presence of the new growth within the stomach, and therefore it is of the greatest importance to examine directly the interior of the stomach in all cases of persistent gastritis in adults, in order to determine whether the chronic inflammation is due to the irritation of a malignant growth.

As regards chronic gastric ulcer, the claim of Riegel that there is always an increased secretion of hydrochloric acid has been disputed by Lenhartz, who finds that in chronic ulcer the amount is often deficient. Moreover, it has lately been shown that recurrent profuse haematemesis may occur without any chronic ulceration of the mucous membrane. The condition known as gastric erosion, or gastrostaxis, is far from uncommon, and this addition to our knowledge has been gained by directly inspecting the mucous membrane of the stomach after laparotomy and incision of the organ.

This brief review of present methods of diagnosis of gastric disease shows, I think, that if a practical method for inspecting the mucous membrane of the stomach is found, a great advance in the diagnosis and treatment of disorders of the stomach will be made.

We have purposely up to the present refrained from examining the greatest possible number of cases, our aim having been to render the instrument as perfect as possible. Thus after an examination it would be found that a slight alteration was advisable, and a delay, often prolonged, had to occur before the next case could be examined.

Transillumination.

The results obtained by this instrument are not only the direct inspection of the mucous membrane, it serves also to transilluminate the stomach. The stomach is gradually inflated with air after the instrument is passed, the amount of distension being gauged by abdominal palpation of the organ. The size and situation of the stomach can thus easily be made out.

The powerful lamp at the lower end is then lighted, and, the room being darkened, we get transillumination. Its value is not, of course, very great, but it serves to indicate the position and size of the stomach approximately, and cases have been recorded in which growths on the anterior surface of the stomach have thrown a shadow on to the bright area. By moving the lamp from side to side the various parts of the stomach can be in turn illuminated.

Gastroscopy.

The possibility of examining the whole of the gastric mucous membrane may seem remote, but it was felt that unless nearly the whole of the stomach could be examined a large part of the value of the instrument as a means of diagnosis would be lost. This object has been attained by the use of the revolving nose-piece. Thus, when the cardiac portion is being examined the tip of the instrument is turned to the left, and by gradually revolving the nose-piece nearly the whole of the mucous membrane in this region can be viewed. When it is required to examine the pyloric end the tip of the instrument is turned to the right and the lower end again rotated.

I would draw attention first to the appearances presented by what we believe to be healthy gastric mucous membrane (see Special Plate).

The first appearance is that of a bright red reflex, very like that seen in ophthalmoscopic examination of the fundus oculi. On carefully focussing with the eye-piece the folds of the gastric mucous membrane can be seen running transversely across the field (Figs. A and B). On the surface are numerous bright specks of light due to the reflexion of light from particles of mucus on the surface. In some cases vessels can be seen as dark lines coursing over the field, and at times branching. A striking feature is the appearance of the pyloric end of the stomach. Here the folds of membrane are distinct (Fig. C), and appear to converge towards the funnel-shaped pylorus (Fig. D), and to blend with the smoother mucous membrane in this region.

The appearances presented by the mucous membrane differ to some extent in the different parts of the stomach. On the anterior surface the folds can be easily seen running transversely across the field. At the cardiac end the folds are not so well marked, and appear to be broken up and irregular. Looking towards the pylorus the folds are very well marked and converge towards the pyloric opening. One of the figures on the plate (Fig. C) shows some of the well-marked pyloric folds, when the wall of the stomach was close to the end of the gastroscope; the folds are seen of natural size or even somewhat larger than normal. Foreign bodies such as food can be recognized by their movements upon the folds of the mucous membrane.

Thus on one occasion we were examining the stomach of a patient who suffered from dyspepsia and who had been ordered a strict diet. Some dark objects were seen inside the stomach, which, on subsequent lavage, proved to be damson skins. Our patient had to admit that he had breakfasted on damson jam.

The drawing of carcinomatous pylorus (Fig. E) is taken from a case under the care of the late Mr. Harold Barnard. The folds around the pylorus are poorly marked, and numerous small elevations can be seen on the surface, as if the mucous membrane were being pushed up by masses below it. At the subsequent operation the pylorus was found to be the seat of a malignant growth.

A small gastric ulcer of recent formation, and not indurated, is shown in another drawing (Fig. F). It occurred in a girl aged 24 who had symptoms of gastritis. Two months after this ulcer had been observed operation was undertaken, and the small ulcer was found to have entirely healed up.

In some cases the gastric mucous membrane is pale, and the folds are not then so easily observed. It is especially in these cases that vessels can be clearly seen running over the field of view and occasionally branching (Fig. G). The last figure on the plate (Fig. H) shows the stomach of a patient who, six weeks before gastroscopy, had had a severe haematemesis. No large ulcer was seen, but in several places in the mucous membrane dark blood clots of small size were observed. They could easily be distinguished from objects inside the stomach, since their position with reference to the mucous membrane did not alter.

Such are some of the results obtained by the use of this instrument. At some future date we hope to bring forward further researches on the direct inspection of the lining wall of the stomach.

HOUR-GLASS CONTRACTION OF THE STOMACH.

By A. GORDON GULLAN, M.D.Lond., M.R.C.P.Lond., F.R C.S.Eng.,
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CASES of hour-glass contraction of the stomach are sufficiently rare to be interesting; and, as recently an example of this condition came under my care in the Liverpool Stanley Hospital, I felt that a report of the history of the patient and a clinical account of her illness would be instructive and acceptable to this meeting, especially as at no time whilst under observation could the bilobed condition of the stomach be recognized by physical examination.

History.—The patient, a single woman, aged 36, always in comfortable surroundings, lived in a healthy district.

TO ILLUSTRATE A PAPER BY DRS. SOUTTAR AND THEODORE THOMPSON.

Fig. A.—Anterior wall, normal.

Fig. B.—Fundus, normal.

Fig. C.—Folds near pylorus.

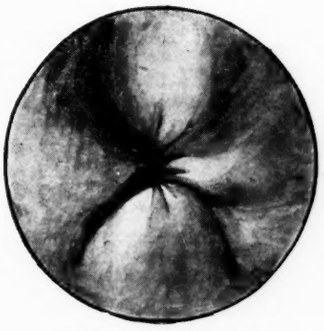


Fig. D.—Normal pylorus.

Fig. E.—Carcinomatous pylorus.

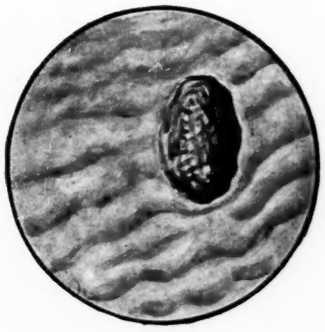


Fig. F.—Ulcer.

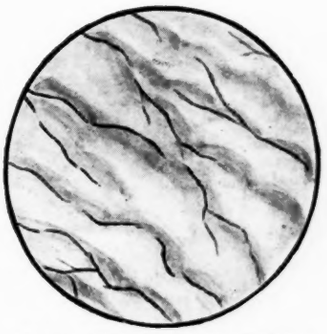


Fig. G.—Anaemic mucous membrane.

Fig. H.—Petechial haemorrhages.

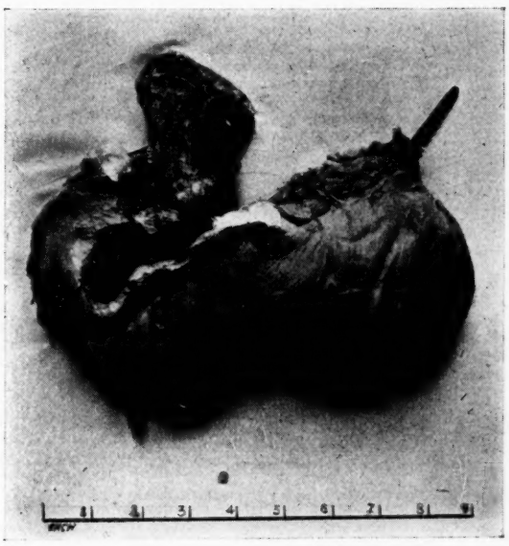
Her family history was good, with no record of gastric disturbance. She had not been subject to any serious or prolonged illness, but ever since her school days she had been a "dyspeptic," by which is meant that she had occasional attacks of vomiting, and vomited easily, without pain, and often without apparent reason. Then about the age of 29 (seven to eight years ago) she developed gastralgia—that is, pain after food, but the pain did not seem to depend on the kind of food taken; and the attacks of vomiting also occurred after food. These symptoms gradually became worse, and in June, 1907, haematemesis was first seen, and was so profuse that it gave rise to severe anaemia; indeed, transfusion alone prevented total collapse. This recurred on several occasions, the quantity of blood vomited varying considerably. At this time she was under my friend Dr. Gilbert Bark, and on a diet of milk only; but her condition varied, improving when she adhered to treatment and relapsing when she failed to carry out instructions. As early as June, 1907, her stomach was recognized to be considerably dilated. The attacks of vomiting now occurred early in the morning, before any food was taken, and for two years prior to admission to hospital (September, 1908) she had been steadily losing weight.

State on Admission (September 3rd, 1908).—She was a thin, anaemic woman, with a sallow complexion and anxious expression. She was distinctly neurotic, and only weighed 5 st. 12 lb. Her tongue was coated with a yellowish fur, and she complained of acid flatulency accompanied by a feeling of distension in her stomach. Examination of the abdomen showed a distinctly tender spot beneath the upper part of the right rectus, and the stomach itself was dilated, extending down nearly to the umbilicus; splashing could be readily obtained, but there was no visible peristalsis. She was constipated and showed signs of general neurasthenia (absence of corneal reflex, knee-jerks exaggerated, and sometimes globus hystericus).

Progress.—A very light diet, gastric antiseptics, and laxatives were prescribed, and on one occasion soon after admission, as the abdominal pain was severe, a blister was applied. Her stomach was also washed out every morning. Under this treatment she steadily gained weight, the stomach gradually diminished in size, and the abdominal pain quite disappeared. She left the hospital in November, 1908—two months after admission—having gained 1 st. 4 lb. in weight, being well nourished, taking light ordinary diet with comfort, and feeling improved in every way. Within a few days of leaving hospital, however, although she adhered to the same régime, vomiting returned and a severe pain was located to the right of the xiphoid cartilage. Her doctor also noticed that the stomach, though it had been normal in size at first, after her return from hospital, steadily became more and more dilated, and she was subject to attacks of intense pain, during which peristaltic movement of the stomach could soon be seen. As no treatment seemed to alleviate the condition the patient returned to hospital on December 17th, 1908. The stomach was then found to be much larger than on any previous occasion, extending two inches below the umbilicus, and to be tender on palpation. There was also tenderness above and to the right of the umbilicus, but this was not so evident as on the first admission. She was very constipated and several times vomited large quantities of frothy curdled milk. The vomited matter contained torulae, sarcinae, free hydrochloric acid, but no blood. Notwithstanding treatment and daily washing out, the stomach became more dilated, succussion being more marked, peristaltic movements of the walls could be readily elicited, and vomiting occurred frequently, large quantities of fluid being ejected. The prominence of the hypertrophied organ was distinctly visible and the greater curvature, a fortnight after her second admission, was found to be four inches below the umbilicus, that is, just above the pubis. All this time the diagnosis was made of pyloric obstruction with dilatation and hypertrophy of the stomach and there was no evidence or physical sign to show that there was any hour-glass contraction.

Operation.—As she steadily got worse an operation was performed by a colleague on January 8th—three weeks after her second admission. On opening the abdomen in the right semilunar line the stomach was found to be very much distended, its walls greatly thickened, and the pylorus, which was situated high up under the liver, was thickened, though apparently not malignant. As the patient was very weak, a posterior gastro-jejunostomy was quickly performed, one noticeable feature being that, although the stomach had been washed out a few hours prior to the operation, large quantities of sticky, grumous fluid escaped when it was opened. She progressed satisfactorily for two days, though there were marked signs of collapse, and strychnine was administered hypodermically immediately after the operation. On the third day, however, vomiting returned and was very intractable, although she had taken nothing except a few sips of water by the mouth, and this continued though morphine was given hypodermically. The matter ejected was offensive, and consisted chiefly of thickish watery mucus, sometimes brownish-red, due to altered blood. Notwithstanding vigorous treatment, she gradually became weaker, rapidly emaciated, and died on the tenth day after the operation in a state of asthenia and toxaemia.

Necropsy.—On opening the abdomen an enormous stomach was seen, extending down from the epigastric region to the pubis. It was found to be somewhat twisted on itself, and to be distinctly divided into two large portions, both of which were larger than an ordinary dilated stomach and each capable of holding at least two quarts of fluid, the proximal cavity being the larger and thinner walled. At the constriction, which was very narrow to the right of the centre of this enormous stomach, there were some fine peritoneal adhesions on the posterior aspect, which united the right side of the proximal portion with the left side of the distal, and thereby prevented the two halves when simultaneously dilated, from separating from each other, and thus prevented the hour-glass appearance becoming evident to physical examination. These adhesions occurred on the posterior aspect of the left half of the stomach, at the site where the great omentum was reflected, this being evidently due to the fact that the stomach had twisted on itself, the greater curvature kinked, and come to lie posteriorly on this part of the stomach. Both pouches had very hypertrophied walls, especially the right pouch. The pylorus was situated high up, and beneath the liver. It was very thick and tough, and its opening would only transmit a small quill. This tough, fibrous tissue was continued along the lesser curvature for a distance of about 4 in., where the hour-glass constriction occurred, and at that point the mucous membrane was thrown into a valve-like fold, and only a large quill or little finger could be passed through.



The site of the constriction appears to be in the more usual position according to Mayo Robson[1] and C. F. Martin.[2]

The interesting features of this case are:

1. The history of prolonged gastric symptoms, haematemesis, etc., which coincide with those recorded by Mayo Robson,[3] Moynihan,[4] and others.

2. The unusual twisting of one portion of the stomach on the other, and the presence of adhesions binding the two parts together and so obliterating the bilobed character.

3. The rapid development of the pyloric obstruction towards the termination of the case, with equally rapid development of muscular hypertrophy.

4. The difficulty of diagnosis. With regard to this, whilst the patient was in hospital inflation with CO_2 gas and examination with the *x* rays after a meal of bismuth, only gave evidence of a very large dilated stomach similar in extent to that mapped out by the ordinary physical methods. The characteristic signs so ably described by Moynihan[5] were in most cases absent. Thus washing out did not give Wölfler's first sign (*a*) "that some of the fluid fails to return, having passed into the second pouch"; indeed, more fluid usually returned than was passed into the stomach. Wölfler's second sign was not present: (*b*) after lavage has apparently thoroughly cleansed the stomach more contents reappear, probably foul and evil-smelling. (*c*) The sign of "paradoxical dilatation" (Jaworski), succussion splash in pyloric cavity after syphonage of the cardiac one, was not detected, though it was probably present just before the operation when the pylorus and hour-glass constrictions were at their maximum development. (*d*) Von Eiselsberg's test was not present owing to the two parts of the stomach being bound together and one overlaying the other. For the same reason (*e*) Moynihan's test was not apparent—namely, "distension with CO_2 gas of two separate sacs"; and (*f*) also on this account Schmidt-Monard's test, a sulcus after inflation with CO_2, was not found. (*g*) Von Eiselsberg's other test—namely, bubbling and gurgling in the stomach—was heard; but this is usually heard in every dilated stomach at some time or other during examination, and we could not

recognize any difference between the sounds present and those of an ordinary dilated stomach.

5. In this case the greater curvature was dragged up towards the lesser, and the hour-glass constriction was associated with fibrous stricture of the pylorus, a condition not uncommonly seen.

References.
[1] *Lancet*, 1904, vol. i, p. 6. [2] *System of Medicine* (Osler and Macrae), vol. v, p. 203. [3] *Lancet*, 1904, vol. i, p. 5. [4] Ibid., 1901, vol. i, pp. 1193-4. [5] Ibid., 1901, vol. i, p. 1191.

TIC DOULOUREUX: THE TECHNIQUE AND RESULTS OF SCHLÖSSER'S METHOD OF TREATMENT.

By Purves Stewart, M.D., F.R.C.P.,
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Tic douloureux, or epileptiform neuralgia affecting the territory of the fifth cranial nerve, is the most agonizing of all physical pains; it is an inveterate malady, whose paroxysms tend to increase in frequency, until ultimately the patient is driven in desperation to one of two alternatives—suicide or chronic morphinism. When discussing tic douloureux we expressly exclude all the minor varieties of trigeminal neuralgia due to local reflex causes, also those cases due to organic disease at the base of the skull.

True tic douloureux has been the therapeutic despair of most physicians and surgeons. Drugs, short of morphine, fail, and operations on the peripheral branches of the nerve only afford temporary relief. As a matter of fact, the only lasting benefit obtained, short of morphine administration, has been by excision of the Gasserian ganglion. But gasserectomy is a grave intracranial operation, with a high mortality even in skilled hands. Even when successful, it produces considerable deformity, with profound anaesthesia of the affected side of the face, eye, nose, and mouth, together with unilateral paralysis of the muscles of mastication, and occasionally a destructive bacillary ophthalmia in the anaesthetic eye. Moreover, in spite of all this, cases of recurrence of pain are not unknown even after gasserectomy.

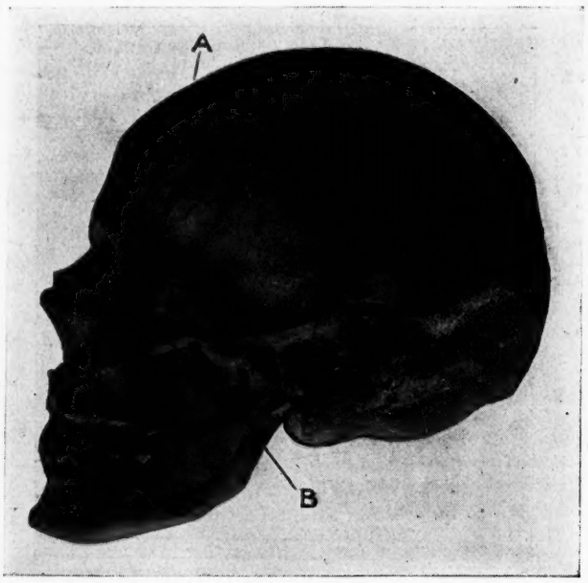

Fig. 1.—To show landmarks for injections into foramen rotundum and foramen ovale. A, Site of puncture for foramen rotundum. B, Site of puncture for foramen ovale.

Within the last three years we have learned from Schlösser[1] of Munich of a practical and much simpler alternative. Schlösser's treatment consists in the injection of alcohol into those foramina at the base of the skull through which the various divisions of the nerve emerge immediately after leaving the Gasserian ganglion. Such injections may produce a slight degree of cutaneous anaesthesia, though this is far from constant, and in many cases the anaesthesia clears up within a few days. Meanwhile, the old pain subsides and remains absent for prolonged periods. Schlösser himself, in a series of 123 cases, gives the average period of relief at between ten and eleven months, and sometimes much longer. The injections can then be repeated, each relapse being milder than the previous attacks, and the intervals becoming longer. By this method no scar or deformity is produced, no motor paralysis, and no trophic changes, whilst the actual puncture can be performed in a few seconds and under a local anaesthetic.

Technique of the Injection.

A stout needle, 10 cm. long and 1.5 mm. in diameter, is used. Within this is fitted a blunt stilette, whose point projects slightly beyond the sharp end of the needle. The needle is marked off in centimetres up to 5 cm., so that we may know at what depth the point is. In making the injection through the skin (previously disinfected, and frozen by chloride of ethyl) the stilette is slightly withdrawn, so that the sharp point of the needle pierces the skin easily. When the point is through the skin, the blunt stilette is pushed home; thus the rest of the penetration is done with a blunt-ended instrument and no injury is done to the deep vessels. When the end of the stilette has reached the foramen in the skull, at the proper depth, the stilette is completely withdrawn; a glass syringe, ready filled with the solution, is fitted to the needle, and the injection is slowly made. We leave the needle *in situ* for a couple of minutes and then withdraw it. There is usually no bleeding, or, if any, it is so trifling that it is quickly stopped by pressure. The needle puncture is covered with collodion, and the whole affair is completed within a few moments. Except in the case of the first division of the fifth nerve, where the needle has to traverse the orbit, I prefer to do without a general anaesthetic; for when the injection is successfully made into the nerve trunk the patient feels a burning pain along the distribution of the nerve which shows we have reached the right spot. If cocaine or eucaine be added to the alcohol this pain passes off very soon, and is followed by anaesthesia as already described. The solution which I employ at present consists of beta eucaine grains 2, absolute alcohol dr. 6, aq. destillat. to 1 oz.

To reach the *foramen ovale*, through which the third division of the trigeminal emerges from the skull, the needle is inserted through the cheek behind the last upper molar tooth, at the lower border of the zygoma,[2] at a point 2½ cm. in front of the descending root of the zygoma (see Fig. 1), which can always be felt as a ridge close to the anterior border of the external auditory meatus. After piercing the skin we push home the blunt stilette, and proceed to penetrate the deep tissues, comprising the masseter and the posterior part of the temporal muscle. The blunted needle is directed backwards and slightly upwards till it impinges on the skull at the external pterygoid plate. It is then pushed on, upwards and backwards, along the bone, until it comes to the base of the pterygoid process. It is then pushed backwards, and slightly more upwards, until it enters the foramen ovale, at a depth usually of about 4 cm. from the zygoma (see Fig. 2). The stilette is now withdrawn, and the injection is slowly made. A difficulty to which other observers have not referred, but which I have occasionally met with, may occur in edentulous subjects, in whom the whole mandible is displaced upwards, so that the upper parts of the ramus and coronoid process are overlapped by the zygoma, thereby preventing the needle from reaching the deeper structures. The difficulty is overcome by making the patient open the mouth widely.

To reach the *foramen rotundum*, through which the second division emerges, is less difficult. Here our guide is the posterior border of the orbital process of the malar bone. We prolong this line downwards to the lower border of the zygoma, and insert our needle ½ cm. posterior to this point (see Fig. 1). Pushing horizontally inwards, and directing the point slightly upwards, the foramen rotundum is reached in the pterygo-maxillary fossa at a depth of about 5 cm. from the zygoma (see Fig. 2), at a level with the inferior extremity of the nasal

bones. The structures pierced by the needle are the anterior fibres of the masseter and the anterior edge of the temporal tendon, though this latter may be missed if the patient opens the mouth widely.

The *supraorbital division*, emerging in three branches through the sphenoidal fissure at the back of the orbit, is rather more difficult to reach with certainty, owing to the proximity of the optic nerve, and of the third, fourth, and sixth nerves. Patrick and Hecht[3] admit that the nerve is more often missed than reached by the needle, but it is not essential that the nerve trunks should actually be touched (though, of course, we should try and do so), because if the alcohol be injected in the immediate neighbourhood of the nerve it diffuses into it. The needle is inserted at the outer margin of the orbit, close within the fronto-malar articulation (see Fig. 3), and is passed along the outer wall of the orbit to a depth of 3½ to 4 cm. Or the puncture may be made midway between the supra-orbital notch and the outer edge of the orbit, passing the needle along the roof towards its outer side.

Fig. 2.—A, Needle with point in foramen ovale at a depth of 4 cm. B, Needle with point (concealed) in foramen rotundum at a depth of 5 cm.

Although a single injection may suffice to relieve the pain, it is advisable to repeat the injection after a couple of days, and until the last trace of pain disappears we repeat the injections at short intervals. In one of my cases no fewer than seven injections were required before the patient was finally relieved.

Certain minor complications may be associated with injections of this sort. Injections into the foramen ovale and foramen rotundum may produce a slight degree of stiffness in the masseter and pterygoid muscles, which are pierced by the needle. Injections into the foramen rotundum may cause slight paresis of the facial muscles, lasting a few days. Kiliani of New York has suggested that this may be due to the connexion between Meckel's ganglion and the facial nerve *via* the Vidian. Sometimes injections into the foramen rotundum may overflow into the orbit, and produce oedema of the lower lid for a day or so. Injection into the sphenoidal fissure always produces marked oedema of the upper and lower lids, and occasionally also transient palsy of external ocular muscles, since the branches of the fifth nerve as they emerge are intermingled with the third, fourth, and sixth nerves. I have once seen the end of the needle nipped off during withdrawal from the foramen rotundum, by sudden upward movement of the coronoid process when the patient closed the jaw.

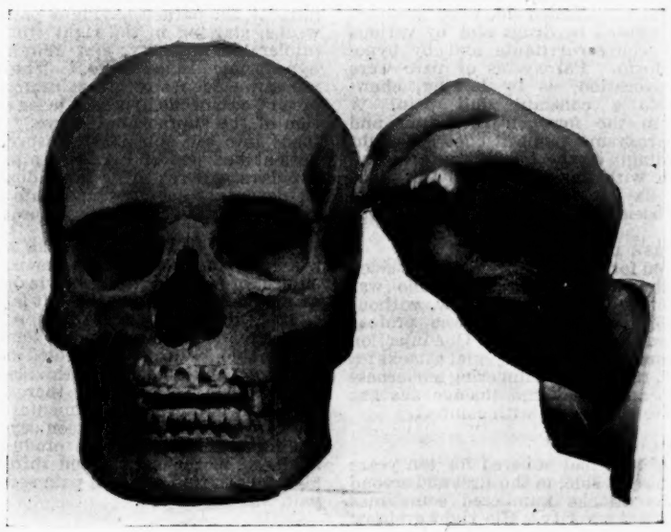

Fig. 3.—Mode of reaching sphenoidal fissure.

Illustrative Cases.

Case I.

A male patient, aged 69, had suffered for seven years from tic douloureux on the right side, mainly in the third division of the nerve. In spite of assiduous treatment by drugs and hypodermic injections of cocaine, the pain had progressively increased in severity. All the teeth, upper and lower, on the affected side had been extracted without avail. The patient was in constant agony night and day, walking about striking his head against the wall during his paroxysms. He could not masticate, and had to be fed with fluids. He came up to London to have the Gasserian ganglion removed, and for this purpose he consulted Mr. Ballance. Mr. Ballance found him to be a stout, flabby man with a feeble heart, with oedema of the legs and albuminuria, and therefore judged the risk of gasserectomy to be too great. Accordingly, injections of alcohol were performed into the foramen ovale and foramen rotundum. These were repeated four times in all within ten days. After the first injection the patient called for his teeth, and ate a mutton chop—the first for years. A week after the first injection the pain recurred, but by the end of the twelfth day all the pain had subsided. Since then—twelve months ago—the patient has been free from pain.

Case II.

A man of 46 had suffered for four years from right-sided facial pain, chiefly in the second division of the trigeminal. Paroxysms were induced by any facial movement, or by chewing. He had been treated by drugs without appreciable benefit for nearly a year. Three injections were made into the foramen rotundum within seven days. After the second injection the spontaneous paroxysms ceased, and after the third injection all pain disappeared. This was eleven months ago, and there has been no recurrence.

Case III.

A woman, 58 years of age, had suffered for three years from paroxysmal pains in the gums and face, in the distribution of the second division of the right trigeminal nerve. Paroxysms were induced by washing the face, and the patient was unable to wear her artificial teeth owing to pain. She had an intermission of six months when under treatment by iron and arsenic; the pain then recurred with increased severity. Osmic acid was injected into the supra-orbital foramen, and gave her relief from pain for two months. The pain then recurred. One injection of alcohol was given into the foramen rotundum ten months ago, since when she has been free from pain.

Case IV.

A woman of 62 had suffered for seven years from right-sided epileptiform neuralgia, chiefly in the third but also in the second division of the nerve. She had been assiduously treated

by drugs without avail, and came prepared to have gasserectomy done if necessary. All the teeth had been extracted. Three injections of alcohol were made into the foramen rotundum and foramen ovale within eleven days. No relief was noticeable until after the second injection on the fourth day. After the third injection the dull pain remaining disappeared, and she is now, six months afterwards, free from pain.

CASE V.

A woman of 50 had suffered for two and a half years from severe paroxysmal pains in the second and third division of the left trigeminal nerve, induced by speaking or chewing. She had a spontaneous intermission fourteen months ago, lasting six months; the paroxysms then recurred and increased in severity, in spite of assiduous medicinal treatment by Dr. Ferrier, who ultimately sent her to me for treatment by deep alcohol injections. She had two injections into the foramen rotundum and foramen ovale at an interval of three days. The pain entirely disappeared from the lower jaw, but she still had dull pain in the supraorbital division. Accordingly, on the ninth day, a third injection was made into the foramen rotundum alone. Since then, six months ago, she has been free from pain, and has been able to resume her occupation as companion, which she had had to resign.

CASE VI.

An old lady of 80 had suffered for twenty years from pain in the second and third division of the right trigeminal nerve. All sorts of drugs had been employed without avail. She was unable to chew or even to wear her artificial teeth, nor could she speak or wash her face without inducing paroxysms of pain. The pain was most marked in the side of the tongue, in the lower gums, and in the lip. There was tenderness on pressure over the mental foramen. Two injections were given into the foramen ovale and foramen rotundum at intervals of four days, and a third injection on the eleventh day into the foramen ovale alone. The paroxysms of pain diminished in frequency and in severity after the first injection, but the patient was highly emotional and somewhat difficult to manage. After the third injection she was entirely free from pain, except for a few twinges a fortnight later during a couple of cold days. After nearly five months since the original injection the pain is still entirely absent.

CASE VII.

A woman, 65 years of age, had suffered for three years from intense neuralgia on the left side of the face, chiefly in the third division of the nerve, but also in the second division. Touching the skin induced an attack. The upper and lower teeth on the affected side had been extracted without relief. She was assiduously treated by gelsemium and other drugs without benefit. Two injections were made into the foramen ovale and foramen rotundum at intervals of seven days. The severe pain ceased after the first injection, and the slight remnants of pain were altogether removed by the second injection. She remains entirely free from pain after four and a half months.

CASE VIII.

A clergyman, 63 years of age, had suffered for four years from severe trigeminal neuralgia in the second and third division of the right side. All the teeth on the affected side were removed without relief. He had been treated by drugs and by various electrical methods, also by counter-irritants and by hypodermic injections of chloroform. Paroxysms of pain were induced on the slightest provocation, as by talking, chewing, shaving. He had also a constant dull pain. A single set of injections into the foramen rotundum and foramen ovale removed the paroxysmal pains at once. A slight dull ache recurred, and accordingly on the fourth day a second set of injections were given with marked relief. A slight recurrence on the twelfth day was treated with a third injection. Since then he has been free from pain, now over four months ago.

CASE IX.

A woman of 68 had suffered for sixteen years from left-sided tic douloureux, mainly in the infraorbital region. She was unable to wash the face, blow the nose, or chew, without inducing a paroxysm. During an attack there was profuse salivation and lacrymation on the affected side. One injection into the foramen rotundum removed the paroxysmal attacks; a second injection, a week later, removed the lingering tenderness of the face. Since then, two and a half months ago, she has been free from pain and able to chew, etc., with comfort.

CASE X.

A male patient, 49 years of age, had suffered for ten years from intense neuralgia on the right side, in the first and second divisions of the nerve. His attacks numbered sometimes twenty per hour and were of great severity. His right eyebrow was worn away by the friction of the hand as he pressed it against the face during the paroxysms. All the teeth had been extracted without avail, and the patient could not shave without inducing an attack. Five injections within eighteen days were given, into the sphenoidal fissure and the foramen rotundum. Some diminution in the number of paroxysms followed the first few injections, but it was not until the fifth injection, on the sixteenth day, that pain ceased. A sixth injection into the foramen rotundum on the eighteenth day finally removed the last trace of pain, and the patient went home three months ago free from pain. This case was particularly obstinate, and the patient deserved great credit for the pluck and determination which he displayed in persevering after the comparatively small benefit resulting from the first four injections.

CASE XI.

A man of 60 had inveterate epileptiform neuralgia for ten years, affecting the second and third divisions of the nerve on the right side. The pain was most intense in the second division; chewing precipitated an attack. There having been no improvement under medicinal treatment, he had two injections into the foramen rotundum and foramen ovale at intervals of three days. The pain was markedly relieved, and he became able to chew without pain. A few momentary flashes of pain still occurred, sometimes in the upper, sometimes in the lower jaw, and for these five additional injections were performed into the foramen rotundum and foramen ovale, according to the site of the pain, the last injection being made five weeks after the first. His general health underwent marked improvement, and he remained free from pain for four months. The attacks then recurred, though with diminished severity, and affecting the lower jaw only. Two and a half months ago I gave him another series of injections into the foramen ovale, and the pain is again relieved.

CASE XII.

A woman, aged 67, had suffered for twenty-five years from supraorbital neuralgia on the right side, the paroxysms being induced by chewing or touching the face. All the teeth had been extracted. Curiously, after a series of severe paroxysms, she always noticed an unusual increase of appetite for food. Under large doses of gelsemium with arsenic she had a year's relief from pain. It then recurred with increased severity, and latterly she has been again unable to wash the face or to chew without inducing a paroxysm. On July 8th an injection of alcohol was given into the foramen rotundum. This rendered chewing, washing, and speaking painless, but she still had occasional spontaneous paroxysms. Accordingly, a second injection was performed on July 12th, and a third on July 15th. She writes me on September 11th that she is free from pain and has returned to Wales.

CASE XIII.

A lady, 76 years of age, had suffered from trigeminal neuralgia in the second and third divisions of the nerve for fifteen years, paroxysms being induced by washing the face, also by chewing, so that she was unable to take solid food. The pain was both in the cheek and in the upper and lower gums and tongue. Two injections into the foramen ovale and foramen rotundum at intervals of six days removed the spontaneous paroxysms, but there still remained some pain in the lower jaw in chewing. Accordingly, a third injection was made on the fifteenth day into the foramen ovale alone. This was two and a half months ago.

CASE XIV.

A highly strung man of 35 had suffered from right-sided headaches from the age of 10 or 12 years. Fifteen months ago he was operated on by Mr. Ballance for suppuration of the right frontal sinus, and there is now no evidence of disease in any of the accessory sinuses. After the operation the right-sided pain, which had been for some time almost constant, became intermittent, the patient having a paroxysm about once every three weeks, starting in the right frontal region, rapidly attaining intolerable intensity, and requiring full doses of morphine hypodermically to relieve it. There was no nausea or vomiting, nor any evidence of gross intracranial disease. There was an area of cutaneous hyperaesthesia corresponding to the distribution of the supraorbital nerve. An injection of alcohol was made into the sphenoidal fissure, but within two hours the patient had one of his intense paroxysms of pain, lasting for two days, and requiring large doses of morphine for its relief. In view of the aggravation of pain which followed this injection, I did not deem it prudent to repeat it.

CASE XV.

A nulliparous married woman, aged 35, who had been the subject of various minor pelvic operations, complained of constant gnawing pain in the left face, chiefly in the second division of the nerve, of eight to nine years' duration. In addition she had violent exacerbations, sometimes lasting for hours, and was unable to lie on the affected side of the face. All the teeth had been extracted on both sides. She belonged to a gouty family. On examination, there was tenderness on pressure over the supraorbital and mental foramen. Four injections in all were given within fourteen days into the foramen rotundum and foramen ovale. These produced moderate anaesthesia and analgesia in the second and third divisions of the nerve, but although the paroxysmal pain seemed better the constant dull pain was unrelieved.

SUMMARY OF RESULTS.

Out of 15 cases of trigeminal neuralgia of the most severe type, some of them in patients of advanced age and feeble physique, 12 cases (or 80 per cent.) have been entirely relieved of pain for periods varying from twelve months downwards. Of the remaining 3 cases, one was free from pain for four months, when the pain recurred, less severely, and has been treated again by the same method. The second case was in a young woman in whom there was a strong element of functional

neurosis, possibly associated with pelvic troubles, whilst the third case was one of old-standing frontal sinus disease.

Since writing the foregoing paper I have had 5 more cases, all of them with a successful result.

This method, therefore, is not a permanent cure of every case of trigeminal pain, yet in the great majority of cases it affords relief for prolonged periods, and we can claim it as a notable addition to our means of treatment in otherwise intractable cases. It is, moreover, free from the pain, risks, and serious deformities of the major operation on the Gasserian ganglion.

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DISCUSSION.

Dr. FOSTER KENNEDY (London) asked Dr. Purves Stewart if he considered the risks of alcoholic injection for trigeminal neuralgia sufficiently negligible to warrant the treatment being adopted in all cases of this condition. Advocates of Schlösser's method had stated that their results were often, in fact usually, achieved by the diffusion of the injected alcohol around the offending divisions of the fifth nerve. This diffusion was an occurrence completely outside the control of the operator; important and even vital structures lay in the immediate vicinity of the injection, and might, it seemed probable, become affected, with disastrous consequences to the patient. For example, retrobulbar neuritis with subsequent optic atrophy had been reported. The operation of gasserectomy in the hands of a careful surgeon almost invariably cured the condition at a risk which was usually grossly exaggerated. In those cases in which some pain still remained there was probably a rare abnormality in the course of some of the nerve fibres; the possible abnormalities in the skull leading to incorrect judgements in the operation of injection were probably less uncommon and equally impossible to guard against. It would seem, after due consideration of the dangers and advantages involved, that the radical cure should be attempted, except in those patients having gross cardiac or other disease, in whom a major operation would cause imminent danger to life.

THE TREATMENT OF TABES DORSALIS.

By TOM A. WILLIAMS, M.B., C.M.,

Washington, D.C.

As a preliminary to the consideration of the treatment of tabes dorsalis, Dr. Williams entered into a discussion of its pathogenesis, insisting that tabes cannot be a dystrophy of the sensory protoneurone since it is a degeneration secondary to a meningitis of specific nature, which falls most heavily upon the posterior roots from anatomical and physiological causes. His observations with regard to treatment were as follows:

Recent evidence tends to show that there is as much validity in administering mercury in tabes, and even paresis when diagnosed early, as there is reason to do so in arterial degeneration and gumma, whether in the central nervous system or not. The latter are both unamenable to such remedies in so far as the contiguous parenchyma has been destroyed; and atheromatous arteries have no more power of regeneration than has the central nervous system. But no one withholds mercury for these reasons; for though it cannot restore dead tissues, we believe that it at least increases resolutive activity and aids in arresting the gravity of the infective process. We are not yet certain whether mercury and iodides act antibacterially or as antitoxins directly, or whether they do so by stimulating the defensive reactions of the organism by means of the internal secretions or otherwise. There is even a possibility that just as digitalis may shorten the life of the individual by using up cardiac energy prematurely, so may mercury exhaust the defensive powers of the patient. Thus Kron concludes from the study of 482 cases that more treatment connotes earlier tabes, and Craveri believes in low doses from his experience of earlier cases, many of which lacked the Westphal sign and had only one symptom.

Faure, of Malou, has pointed out that mercury, while it does harm to tabetics with chronic cystitis or intestinal troubles, or cachexia, is of great benefit even in some cases of tuberculosis, if not pulmonary. He quotes a case of a man of 40 who had had tuberculous ostitis, and was attacked by a severe tabes with multiple symptoms. After five years of mercurial treatment he is in excellent health, and most of the annoying symptoms have disappeared. Moreover, in tuberculous cases not treated by mercury relapses are very frequent.

In Donath's case the knee reflexes, which had disappeared five months after the first symptoms showed themselves, returned twenty-two months later.

The experience of Erb and Babinski strongly confirms the usefulness of mercury; they find that the pain especially disappears after thorough treatment, and that the progress of the disease ceases, although, as before explained, regeneration cannot be expected. Lesser believes that the Wassermann reaction is of use in controlling the administration of mercury, in that it becomes much feebler during treatment, and that he has found it in only 50 per cent. of tabetics, on account of the well-known tendency to arrest in this disease, whereas the complement is deviated in all cases of paresis.

It must be recollected that the specific meningitis which causes tabes is often complicated, especially in later life, by arterio-sclerotic conditions. These long ago caused Gowers to place degenerated spino-cerebellar tracts in the picture of tabes. In estimating the pathogenesis of tabetic disorders such anomalies must be taken into consideration. Thus, Long reports a case of spastic tabes where the reflexes disappeared only at the end of the disease, and the roots were little altered.

In the early stages, too, the pial trabeculae, in reacting to the noxa, may show peri-arterial infiltrations, as shown first by Bentler, as Schroeder found in 5 cases, not only in the posterior column, but in the whole circumference of the cord and optic nerve and brain stem as well, though not in the cortex. These appearances were not found in alcoholic pseudo-tabes. This is the process that occurs in the cortex of paralytics; but, according to Alzheimer, it rarely occurs within the cord of tabetics, although he, in common with Nageotte, has always found infiltration and thickening of the pia mater itself, as has Spiller in most cases.

Another source of error is the acute and grave degenerations of medulla and nerve which sometimes occur in syphilitics, whether tabetics or not. Thus Preobraschensky reported a case which died in thirteen days after onset of an acute muscular atrophy of limbs and trunk. It was only at the end of the illness that pains and irregular pupils ensued; the man had had syphilis fifteen years before. *Post mortem*, atrophy of the anterior horns and infiltration of the vessels of the cord, with atrophy of the roots near the cord, were found.

Crouzon and Villaret report that after some months of right sciatica (meningo-myelitis) a man of 42 died in eight days of an acutely ingravescent ascending paralysis. François-Dainville reports that seven years after infection, with no symptoms or treatment, a woman of 23 was admitted owing to albuminuria. She had no cerebral symptoms, not even headache; but she died in nine months, a tabetic. *Post mortem* was found a meningo-vascularity, like that first described by Déjerine and Sottas.

I have by no means exhausted either the facts or the arguments in favour of the point of view here presented, for they are accumulating daily, and while in Paris last month I myself observed an extraordinary number of cases of tabes fruste, local radiculites and early cortical manifestations of luetic meningitis.

When seen and treated in this early state, these conditions may be at least arrested in a large proportion of cases. This is particularly the case with regard to the ocular symptoms; but mercury must be given here by intravenous injection, so that it may rapidly gain access to any diseased focus. In Abadie's clinic during the last eight years an average of 30 cases has been injected per day; and there has never been the least accident, phlebitis or pain never having occurred. In St. Louis, on the other hand, these complications are not infrequent, and they are due to timidity in making the injections and to one not adopting the safeguard of drawing a little blood from the vein into the syringe before injecting the solution. Wm. Froguer informs me that a considerable number of

cases of tabetic optic atrophy has in this way apparently been arrested, sometimes with considerable recovery of vision. Not only so, but the lightning pains from which many patients have suffered for years (although they do not come to the ophthalmological clinic for these) have often been treated without avail as rheumatism. It is the characteristic diplopia, amaurosis, ptosis or iritis which brings them to Abadie; and the cure of the lightning pains or improvement of an ataxia which may be present is to the patient an incident in the relief in his ocular symptoms.

Milian, too, reports both complete and symptomatic cures in early cases. He believes, however, that late cases are aggravated by mercurial treatment. Montagnion and Girond of St. Etienne also report cures; and many other observers in pushing the mercury and introducing it directly into the system are actively testing this method of treatment.

PRURITUS IN LYMPHADENOMA.

By H. D. Rolleston, M.D., F.R.C.P.,

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Itching of the skin in lymphadenoma is not very often recorded; thus, in 86 cases of lymphadenoma mainly published since 1903, and analyzed by Longcope,[1] its occurrence was mentioned in 3 only. It is probably commoner than this, if I may judge from cases which I have seen and been informed about by medical friends. Perhaps the reason why the presence of pruritus is not more often noted in the reports of cases of lymphadenoma is that the association is not very widely recognized, and that its occurrence is regarded as accidental, and without any direct bearing on the subject. Mr. F. H. Watson has examined the records at St. George's Hospital, and has found that out of 20 cases pruritus occurred in 3. Byrom Bramwell[2] has recently published a case of lymphadenoma with intense pruritus in which there were recurring crops of extremely itchy papules on the skin.

The cause of the pruritus is unknown. It is not due to drugs, although in one case it was ascribed by the patient to potassium iodide. It may occur before the disease is diagnosed, and before the patient is given arsenic. It does not appear to have any direct relation to x rays. It is certainly not specially related to the presence of lymphadenomatous growths in the skin; these growths are very rare—much rarer than pruritus in the disease—and in very few of the cases of pruritus was there cutaneous invasion. In one case in St. George's Hospital, a boy aged 16 years, there were growths in the skin; this case was published by Dickinson and Fenton[3] on account of the growths in the skin, but they do not mention the pruritus which Dr. Graham Little, who was much interested in the case, assures me was present.

I have not been able to establish any constant relation between widespread lymphadenoma of the viscera and pruritus.

In a man aged about 34, seen in private, who had been operated upon for supposed hepatic abscess, and was then found to have lymphadenoma, there was no pruritus.

In a man aged 50, seen in private, who had also been operated upon, and a piece of the liver removed which showed lymphadenoma, there was severe itching of the skin after the operation, which he ascribed to the administration of iodide of potassium. The itching disappeared while the lymphadenoma progressed.

In a man aged 40, under Dr. J. Collier's care in St. George's Hospital, with lymphadenoma of the liver, itching came on very shortly before death—within forty-eight hours—the patient, who was somewhat delirious, complaining that the nurses had put fleas into his bed.

In Dickinson's case of pruritus, already referred to, the liver was lardaceous, but did not show lymphadenoma.

It is natural to surmise that it is toxic and due to a poison liberated in the evolution of the disease. In Dickinson and Fenton's case already referred to it is noteworthy that the liver showed lardaceous change, although there was not any evidence of syphilis or suppuration. The lardaceous change suggests the action of a toxin, and so supports the suggestion that the pruritus was due to a like cause. Nicolau,[4] in an account of the cutaneous manifestations of leukaemia and pseudo-leukaemia, describes a case of lymphadenoma with generalized exfoliative dermatitis and pruritus, and refers to similar cases recorded by Wassermann, by Peter, and by Elsenberg. It might, perhaps, be argued that the occasional occurrence of generalized exfoliative dermatitis in lymphadenoma supports the view that pruritus is toxic.

The question arises whether, as I am inclined to conclude, pruritus has a special relation to lymphadenoma, or whether it also occurs in leukaemia. I have not noticed it in any cases of leukaemia, and in a remarkable case of leukaemic tumours of the skin shown by Dr. Wilfrid Fox and myself at the Dermatological Section of the Royal Society of Medicine on June 17th, 1909, there was not any pruritus. On the analogy of the itching of jaundice, which is hardly ever seen in children, a similar exemption might be anticipated in young subjects with lymphadenoma. The earliest age at which it occurred among the cases of which I have notes was 16 years, in Dickinson and Fenton's patient, and the next 17 years, in a girl under the care of Dr. F. P. Whittick.

Pruritus may be one of the earliest symptoms of lymphadenoma, and appear before any glandular enlargement has been noticed. The occurrence of pruritus has in some instances caused the patient to consult a dermatologist first, and has indeed led to the diagnosis of lymphadenoma (Radcliffe Crocker). I have been told of other cases in which inexplicable and severe pruritus preceded any obvious evidence of lymphadenoma. Sir Cooper Perry has given me the details of the case of a man who came under observation for pruritus, and a lichenized condition of the skin due to scratching; as the inguinal glands were enlarged the question of Hebra's prurigo was raised. The man died, and the necropsy showed undoubted lymphadenoma. Although most striking as an early symptom of lymphadenoma, pruritus may occur late in the course of the disease. It may disappear as the disease advances, and may appear and disappear again and again.

In one case which I saw bouts of itching occurred at intervals, and were followed by definite enlargement in the size of the glands. It may begin first in the limbs, or be universal and so severe that the skin is torn into innumerable sores by scratching.

In some of the cases in which it has been a very early symptom the disease has run a very rapid course; and though it is unwise to generalize from a few cases, my impression is that the early onset of pruritus points to a rapid and virulent form of lymphadenoma.

In some cases the pruritus is so refractory to ordinary treatment that morphine is necessary.

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THE VALUE OF MENTAL SYMPTOMS IN DIAGNOSIS.

By W. J. Maguire, B.A., M.D., F.R.C.P.,

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The object of my remarks is to draw attention to the value of investigating mental symptoms occurring in general medicine, and thereby obtain help in an accurate, and often an early, diagnosis. We cannot ignore the fact that bodily and mental functions are concomitant factors in life, both in health and in disease. As Maudsley says in a recent brilliant address, we must recognize a "unity of body and mind"; there is no disturbance of the one without some abnormal manifestation of the other.

When we contrast the gloomy mood of the sufferer of hepatic disorder with the ever hopeful mental attitude of the young phthisic, or again, the mental torpor of the defective thyroid patient with the "boasts of strength" of the physically-weak general paralytic, we are forced to admit the great importance of a sound knowledge of mental symptoms in general medicine.

It is not intended in any way to minimize the enormous value of modern scientific research, but rather to urge that the mental attitude in diseased conditions should not be ignored. We should not, for example, be content with the

cut and dry physical examination of a patient the subject of chorea, but should take particular pains to investigate the mental symptoms, which are often the earliest indication of the onset of the disease. Nor again should we be enthusiastic when we obtain a positive Wassermann reaction in an early case of general paralysis of the insane, the diagnosis of which could be much more easily arrived at by a simple analysis of the mental disturbances invariably present.

I do not say that it will be possible to label a certain group of mental symptoms as characteristic of a definite physical disorder, but I do say that careful psychological inquiry into the vast majority of cases met with in the wards of large general hospitals would yield an amount of knowledge that would prove extremely useful, not only in diagnosis, but in prognosis and treatment. Further, were even a little such teaching given to students, it would tend to the acquirement of a more intimate knowledge of the patient's feelings and experience, which, I submit, is valuable in the treatment of every case, and, in addition, would help to correct the somewhat veterinary-like manner of examination adopted by some and so justly resented by the patient.

It has, I make bold to say, fallen to the lot of some of us, when confronted with a case presenting mental disturbances, to feel more or less at sea in our efforts to arrive at a diagnosis. I have known such a case diagnosed as cerebral tumour by a noted surgeon, acute mania by a distinguished physician, resulting in the patient's removal to an asylum, where he passed through an ordinary attack of typhoid fever with recovery. And again, a young man presented the symptoms which suggested the diagnosis of disseminated sclerosis, with a fairly good prognosis, but a careful examination of the mental state left no doubt that it was a case of general paralysis of the insane, and death occurred in two years. Or it may be a young adult is brought to hospital with a history of loss of speech of sudden onset, and nothing else, and the case is vaguely labelled aphasia; yet he has disturbances of memory and orientation characteristic of anergic stupor, which is cured in a week by brisk purgation.

As a means of investigating mental symptoms for the purpose of diagnosis, the following method might with advantage be adopted:

1. *Family History.*—Inquire into any hereditary tendency to nervous diseases—alcoholism, epilepsy, syphilis, etc. Such taints in the parents are prone to render the offspring liable to chorea, hysteria, etc.

2. *Personal History.*—Inquire into the nervous conditions in infancy, in childhood—whether the patient has been the subject of fits or convulsions. Next, the period of adolescence, or puberty; or, if a married woman, pregnancy, labour, lactation should receive attention. Lastly, the patient's employment should be noted.

3. *History of Present Illness.*—Sudden or gradual onset. Exciting or predisposing causes.

4. *Psychical Examination.*—Disturbances of consciousness:

   (*a*) Coma.
   (*b*) Befogged state.
   (*c*) Diminished sensibility.

   (*a*) *Coma.*—This disturbance is met with in various toxic conditions—head injuries, brain tumour, etc.
   (*b*) *Befogged State.*—Met with in epilepsy.
   (*c*) *Diminished Sensibility.*—Met with in cases of various poisoning—for example, chloroform, ether, etc.—and also in the infectious fevers.

5. *Orientation.*—That is, the clear comprehension of one's environment as to time, place, and person. Disturbance of orientation is a frequent symptom in fevers, acute and chronic alcoholism, etc.

6. *Memory.*—Here it is important to ascertain the nature of the disturbance, whether there is loss for recent or past events, or amnesia, or paramnesia. We meet with such symptoms in paralytic attacks, head injuries, cerebral tumours, Korsalow's syndrome.

7. *Attention.*—Disturbance of this function is of great importance in our examination of the young. For example, we find inattentiveness frequently accompanying such a common condition as adenoids. Blunting of attention occurring at puberty or adolescence may be a prominent symptom, warning us of the onset of serious mental deterioration. During convalescence, after an attack of typhoid fever we are all familiar with distractability of attention.

8. *Judgement.*—This does not so much concern us as the alienist. It is sufficient for our purpose to note the delusions of jealousy met with in the chronic alcoholic and the hypochondriacal delusions often existing in a patient who has been the subject of syphilis, or it may be of gonorrhoea.

9. *Volition.*—In fevers, alcohol and chloroform poisoning, various toxic states, from stuporous conditions to acute mania, manifold disturbances of this function are manifested.

10. *Emotions.*—Here we investigate the temperaments of our patient, important alike in diagnosis and treatment. We are familiar with the irritable condition of the epileptic, the hysterical and the choreic child, the sunny, hopeful disposition of the phthisical, the feeling of well-being of the general paralytic, not to mention the well-known drunkard's humour.

With some such method in our mind we could, I believe, gain a fairly comprehensive knowledge of a case presenting mental symptoms, which would be helpful to us in diagnosis.

MISCONCEPTIONS CONCERNING THE RIVIERA.

By D. W. SAMWAYS, M.D., D.Sc., M.R.C.P.,

Mentone, France.

IT often seems to me a pity that the profession at home is not more skilful when ordering patients abroad. Nothing is more common than to hear visitors on the Continent ridicule the suggestions and directions received from their English medical advisers relating to the places suitable for their treatment abroad. In this matter a little knowledge is a dangerous thing, as, unlike much medical advice, it is easily tested. When, as is commonly the case, the advice proves erroneous, doubts arise on other things in the minds even of the faithful. When recommending a resort, fashion and fancy ought to have no more than a casting vote in its selection. Judging, however, by what one sees and hears, these factors dominate the consulting-room no less than the boudoir and drawing-room. The fashionable physician should be one who leads opinion in these matters, not one who meekly follows it; and his judgement should be able to stand up against the fancy or fad of the hour.

There is, moreover, a regrettable lack of dignity shown in the way advice on health resorts lacks stability and balance. One year the orders are all for Nauheim, or it is the grape cure or the sun cure which is *de rigueur*. The next year the place or treatment has been found not to be infallible, as from the first should have been anticipated, and the consultant, instead of recognizing the good in his last year's pet, and indicating its deficiencies and drawbacks, straightway condemns the whole.

Like other places, the Riviera has been petted and dropped for new loves and charmers. It is out of favour with a large section of the medical profession, though it otherwise seems to remain as popular as ever. I want, if possible, to remove one or two of the misconceptions which, I think, mislead or prejudice the profession against a district which is still well worthy of their support, and likely to justify it.

In the first place, it is usually supposed that the Riviera has a marine climate. All the important text and guide books, whether medical or otherwise, teach this. The argument is that the Riviera, being by the sea, must be grouped among places having a sea climate. On one side, however, the Riviera is by the mountains; why should it not equally be grouped among mountain resorts? Must the south side count as everything and the north as nothing? Textbooks say the climate is marine; a map leaves the matter doubtful, but statistics prove that the climate is essentially that of the mountains adjacent.

The Riviera is by the sea as regards position; it is remote from the sea as regards climate. During approximately 100 per cent. of the nights the air moves seaward. I was told by the chief officer of Gordon Bennett's yacht, which for years lay off the Riviera in winter, that an off-shore wind at night is almost universal, and my experience of thirteen years fully confirms this record. The mountains immediately behind the Riviera are the Maritime Alps, and rise in many places, as behind Mentone, to 3,000 or 4,000 ft., while in all places they reach, within no great distance, to 6,000 or 8,000 ft. in height. It is the air descending from these mountains which sets through the towns seaward at night-time. The inhabitants of the Riviera are, therefore, at night-time as much in the mountains as if they were in Switzerland, and breathe the same fresh, invigorating, and exciting air.

During the day-time the air likewise passes seaward on most fine days, and when during the day there is a temporary indraught from the sea, consequent on the sun's

rays heating the land, this breeze from the sea is not a sea breeze. It is usually mountain air which, having set seaward during the night, is sucked back as an indraught during the hottest hours of the day. As a hare doubles on its course, so does the north-born air come in for a few hours from the southern sea. It is still dry, fresh, mountain air, utterly unlike what is known in England as a sea breeze in feel and characters.

Occasionally we have a true sea breeze from the south-west or south-east, with a falling barometer. This is usually accompanied by cloud and rain, and is comparatively rare. On these cloudy and wet days the Riviera climate may be marine, but they are the exception, not the rule, while a breeze from the sea at night is almost unknown. Sunday has as much influence on the habits and morals of the Riviera as the sea has on its climate. They both count for something, and deserve a passing mention, but are far from being of marked importance.

The second misconception concerning the Riviera climate relates to its treacherousness. Now, treachery implies either deception or faithlessness, and the fault may lie either with the thing abused or with the abuser. The Riviera climate is deceptive to a man who makes the British climate a standard for climates. A newcomer often carries an umbrella when it is cloudy while he leaves his overcoat at home when it is sunny; and if he be deceived it is not because the climate is treacherous, but because it is faithful to itself, and takes no account of his insular prejudices and standards.

Many an English physician depreciates the Riviera because when he visited it, in an exhausted condition, for a week's change of air and scene he caught the worst cold of his life, and returned home a sadder, and, unfortunately, a more ignorant, man. It is not invalids who catch colds on the Riviera because of the climate, but healthy persons who climb the mountains in the sunshine and sit down to cool on the top, or who drive about without overcoats or wraps, forgetting that with a summer's sun there is winter air. Colds are not common on the Riviera with a man who knows how to take care of himself and makes use of his knowledge. They are very common with a stranger who thinks he knows, and who will live and behave as though it were summer.

The climate, I say, is faithful to itself and perfectly consistent. During thirteen winters I can only twice remember catching a cold which I could trace to a chill; once through driving without an overcoat, and once when waiting two hours at the station for an overdue train.

There is no danger to the most delicate invalids who behave wisely on the Riviera, though there is some danger in getting there. The journey certainly has risks, but the place itself, to a person instructed regarding the climate and careful to follow these instructions, has no tricks and inconsistencies, and is as free from risks as the most approved or newly discovered of climates.

The climate is also sometimes condemned for its inconstancy. Taken on the whole, the climate is almost too constant for invalids, who often do best when it is variable. Just as it has been shown that a weak heart does not want constant rest, but rather suitable exercises, so my experience indicates that weak lungs are the better for having to adapt themselves to limited climatic changes; and digestion seems to follow the same law, for Mitchell Bruce writes: "It may appear remarkable at first sight that there are limits even to the advantages of digestibility of food for the sick. The functions of the stomach and bowel tend to become impaired by complete or protracted rest." One advantage of the Riviera over Madeira and like equable climates is that the changes stimulate the appetite (which seldom fails) and give reasonable opportunities for exercising the adaptation powers of the lungs.

The third misconception I should like to correct is the prevalent idea that invalids are unwelcome on the Riviera. This arose from an effort on the part of the hotel-keepers in Mentone to remove the prejudice created by the impression that consumption abounded there. The Engadine and sanatoriums had long since deprived Mentone of the tuberculous patient, but not of the reputation for receiving him. To have the stigma and nothing else was not business, hence the published and well-known announcement from the bulk of the Mentone hotel-keepers that they will no longer receive tuberculous patients. Notwithstanding that announcement, I have never had any difficulty in keeping or placing a consumptive in any of these hotels. Naturally no hotel-keeper, either on the Riviera or elsewhere, desires to receive an individual looking like the pictures of a raised Lazarus; but no hotel manager would exclude—on the contrary, he would welcome, especially in the early or late winter months—such invalids as are fit to face so long a journey as one to the Riviera. A tuberculous patient is an arch deceiver, and generally would be passed by a hotel proprietor as a fit and proper person to adorn his hotel. Patients whose appearance is a distress to their neighbours can be accommodated in flats or villas, if it be considered advisable, as sometimes it well may be, to send them abroad.

I should like to pay a passing tribute to the value of the Riviera climate for lung complaints, though I am not anxious, all things considered, to see its merits appreciated as they should be by phthisical patients. I am convinced that the reputation the Riviera gained under Dr. Bennet of Mentone many years ago it still thoroughly deserves, and it would be well for the profession occasionally to bear its usefulness in mind. As a place it is sunny, cheerful, and dry. If a mountain climate is the most useful for the majority of consumptives, as the popularity of high Swiss resorts for these cases seems to indicate, the Riviera, and especially Mentone, has a mountain climate. The air has most of the advantages and lacks many of the disadvantages of high mountain air, and particularly, that being at sea level, it is more suited to those—heart cases especially—who find high altitudes trying and to people with low vitality. A large proportion of the Riviera medical men settled there because of pulmonary breakdown, and, in spite of the fact of comparatively unfavourable conditions associated with having to practise, they have almost all done well. "Physician, heal thyself," has been practised successfully in their case, and they are well justified in recommending the cure.

The fourth misconception relating to the Riviera to which I desire to call attention is the impression that the so-called English Riviera offers climatic advantages comparable to the French. I have a home on both the Rivieras, and I find the month of October in South Devon more wet and wintry than the whole of the subsequent six months in Mentone.

The misunderstanding is due to the fact that the air temperature on a given day in winter is sometimes the same on both Rivieras. The comparative climatic merits of two districts cannot, however, be settled by occasional temperature records. Thus on February 13th last the *Daily News* contained the following statement: "Last night the only mild place was Iceland. At Seydisfjord temperature was as high as 50°, or 18° warmer than in the South of England." Unfortunately for the Icelandic Riviera there are no boat or railway companies interested in its development. Where otherwise would the South of England be in face of such a record? The same paper on February 15th contained the following remark: "Aberdeen was not only the warmest city in the United Kingdom yesterday, with a temperature of 49°, but was 13° milder than Biarritz at the same hour." Where would Biarritz be against Aberdeen if this state of things were other than exceptional?

Supposing, however, that the external air temperature were on the average equal on the English and French Rivieras, the conclusion that the climates were comparable would still be grossly erroneous. Sea breezes, humidity, cloud and dullness, characterize the one; mountain air, dryness, blue sky and sunshine distinguish the other. A temperature of 45° at Penzance or Torquay means an indoor temperature in an unwarmed house of perhaps 50°, whereas a south room at Mentone will often record a temperature of over 60° under the same conditions. The difference is due to the difference in sunshine. With an air temperature of 45° the Riviera is commonly bathed in blazing sunshine, and the walls of the houses are steadily being baked all day. An unwarmed front room in Mentone will seldom fall below 50° at night-time, though the thermometer outside fall to freezing point. As a large proportion of life in winter is inevitably spent indoors, the sun-bathed houses of the South of France are drier and warmer than those of the South of England in proportion as the sunshine is more constant and more generous.

SECTION OF PATHOLOGY.

Professor W. ST. CLAIR SYMMERS, President.

PRESIDENT'S INTRODUCTORY REMARKS.

PROFESSOR SYMMERS, after addressing a few words of welcome to the members and a brief allusion to the contents of the programme, called for the reading of the first paper forthwith.

OBSERVATIONS ON THE PATHOLOGY OF INNOCENT GOÎTRE.*

By HELEN CHAMBERS, M.D., B.S.Lond.,

Clinical Pathologist, Royal Free Hospital; Scholar, Cancer Research Laboratories, Middlesex Hospital.

THE present paper is based on a study of 261 cases of goître recorded in the registers of the Royal Free Hospital during the nine years 1900–8. Mr. James Berry has already published many of these cases in his book on *Diseases of the Thyroid Gland*, 1901, and also in a paper entitled "An Analysis of 274 Additional Cases of Removal of Goître by Operation,"[1] considering them chiefly from the clinical aspects.

In the present investigation the object has been to study the pathological changes occurring in the thyroid gland in cases of innocent goître, and in collecting the hospital statistics only those cases are included which have been treated by operative removal; of these 93 have been examined histologically. Cases of malignant disease and a few rare tumours of the thyroid recorded in the same period of time have been omitted and are considered elsewhere.[2] The classification of the different types of goître treated during the last five years is based on my own observations of the specimens after removal; previous to this date the description of the specimen as found in the hospital records has been adopted. I am indebted to the authorities of the Royal Free Hospital for permission to make use of the records; to Mr. Berry for allowing me to have free access to the notes and material of both his hospital and private cases; and to Mr. Legg for permission to use the clinical notes of two of his cases. I have to thank Miss Wortham for much care taken in the preparation of sections, most of which have been cut by the celloidin method, and to her I am indebted for most of the photomicrographs.

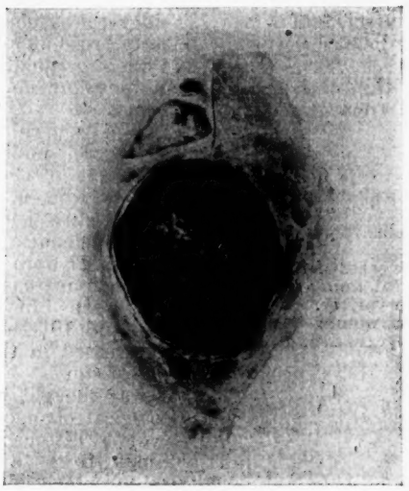

Fig. 1.

With the exception of 2 cases of Graves's disease, all the cases of innocent goître operated on during the period 1900–1908 can be classified, from the structural changes in the thyroid gland, into three groups:

1. Parenchymatous goître 30 cases
†2. Adenomatous goître ... 174 ,,
3. Adeno-parenchymatous goître ... ... 55 ,,

In the first group—that is, parenchymatous goître—there is a uniform enlargement of the whole thyroid, involving both lobes—isthmus and pyramid (if present)—and the gland hence retains its original shape. The outer surface is smooth, except, perhaps, for slight irregularity, caused by enlargement of the lobules. These are more distinct than in a normal gland, and are outlined by fibrous septa, extending inwards from the capsule. The cut surface shows an almost homogeneous structure. The vesicles are everywhere distended with clear colloid. Small cysts are often found, due to the coalescence of adjoining vesicles. They are rarely more than 1 cm. in diameter.

The cases of the second group—that is, adenomatous goître—are characterized by the development in the gland of encapsuled masses having a structure resembling more or less closely that of the thyroid gland tissue. Fig. 1 shows the cut surface of a thyroid of this type. It is a vertical section through the right lobe of a thyroid gland removed *post mortem* from a woman, aged 48, who died of lymphatic leukaemia, and was said to have had Graves's disease four years previously. In the centre of the gland there is a colloid adenoma showing as a dark spherical mass, owing to the translucent tissue of which it is composed. In the upper part of the same lobe there is a small triangular-shaped adenoma, and in the gland tissue around there are several smaller masses, which are possibly of the same nature. The shape of the thyroid in this type of goître depends entirely upon the number, size, and position of the encapsuled masses embedded in it. It is rarely symmetrical, one lobe being often more enlarged than the other. The surface is usually irregular, owing to the underlying rounded masses encroaching upon and pushing outwards the capsule of the gland. The gland tissue is little, if at all, enlarged, and the goître increases in size by the continued growth of the adenomata embedded in it. Degenerative changes in these tumours are extremely common, consisting of haemorrhage, softening, cyst formation or calcification. In this series of cases the adenomata have been removed by enucleation, or more commonly by resection-enucleation. The majority are of considerable size. They have varied in weight from 18 to 393 grams. A single adenoma was removed in 141 cases, multiple adenomata in 33 cases.

The cases of the third group—that is, adeno-parenchymatous goître—are characterized by the development in the thyroid of many encapsuled masses combined with enlargement of the gland tissue. Fig. 2 shows the cut surface of a goître of this type. It contains many encapsuled masses which are spherical or irregularly angular, depending upon the pressure of the surrounding tissues. They are similar in structure to the adenomata of Group 2, and, like these, are commonly undergoing degenerative changes, and may be completely cystic. The gland tissue is increased in quantity, and in some cases much of the thyroid enlargement is due to this overgrowth of the parenchyma. In other cases the gland tissue is less affected, or it may undergo secondary fibrotic changes; the enlargement is then chiefly due to the growth of the adenomata. The shape of the thyroid in a goître of this kind varies considerably. One lobe only may be affected, or more commonly both lobes are involved, one being larger than the other. The whole organ is sometimes uniformly enlarged and smooth, and the distinction from a parenchymatous goître can then only be made after the goître has been removed and incised. In most cases, as in the adenomatous forms, the surface is nodular, owing to the adenomata encroaching upon and pushing outwards the capsule.

Fig. 2.

The relation of goîtres of the second and third groups to each other is probably very close, and in many cases

* Part of this paper formed the subject matter of a thesis accepted by the London University for the M.D. degree. The expenses of the research were defrayed by the Mabel Webb Research Scholarship.

† Cysts of the thyroid are included in this group, as it is now well recognized that in the large majority, if not in all cases, they result from degenerative changes and softening of adenomata.

TABLE I.—*1900–1908.*

Age Period :	All Ages.		Age 10–15.		Age 15–20		Age 20–25.		Age 25–30.		Age 30–35.		Age 35–40.		Age 40–45.		Age 45–50.		Age 50–55.		Age 55–60.		Age 60–65.		Age 65–70.		Age 70–75.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Adenomatous	17	157	2	2	1	10	4	24	4	28	2	27	—	26	—	18	1	11	2	6	—	3	1	—	—	1	—	1
Adeno-parenchymatous ...	—	55	—	—	—	4	—	4	—	9	—	9	—	11	—	8	—	8	—	2								
Parenchymatous	11	19	2	7	7	7	2	5																				
Graves's disease	1	1	—	—	—	1	—	—	1																			
	29	232																										
Total	261																											

a sharp line of demarcation cannot be drawn. The chief difference often lies in the fact that in the purely adenomatous group the treatment consists in enucleating the adenoma and leaving most of the gland intact, and in the adeno-parenchymatous the whole of one lobe or portions of both are removed.

For the following reasons I believe that the purely parenchymatous must be distinguished from the other forms of goitre:

1. The macroscopic changes in the gland are distinct. The whole gland is affected uniformly; there are no encapsuled masses, and the tissue has no tendency to break down or form cysts of large size.
2. It is a condition occurring almost exclusively in young adults.
3. In comparison with other forms of goitre cases of this type rarely need surgical interference. In a total number of 261 cases treated by operation 30 only were of this variety.
4. The marked tendency of goitre to affect women is much less evident in this form. During the eight years 1900 to 1907

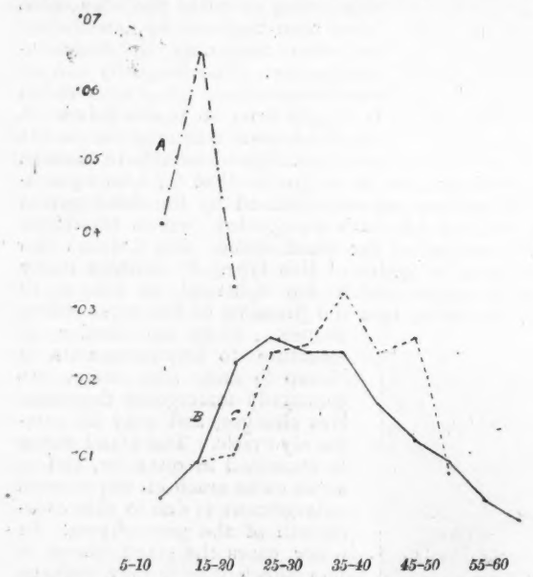

Fig. 3.—A, Parenchymatous goitre; B, adenomatous goitre; C, adeno-parenchymatous goitre.

21 cases were treated, 10 males and 11 females, an almost equal proportion in the two sexes.

Table I gives the total number of cases operated on during the nine years 1900 to 1908, arranged in quinquennial age periods. In each case the age taken is that of the patient at the time of admission to hospital, and it hence corresponds to a time when the goitre had become so large as to necessitate operative interference.

The relative proportionate liability to the three types of goitre at different ages is represented graphically in Fig. 3.*

* In working out the age incidence from the data of Table I the number of cases in each quinquennial age period has been converted into a percentage of the number of survivors at each corresponding period out of 100,000 females born, and before representing these percentages graphically they have been multiplied in each group by the factors $\frac{100}{36}$, $\frac{100}{122}$, and $\frac{100}{88}$ respectively for the purpose of inter-comparison, the denominator in each factor being the total number of cases in the group.

It will be seen that the cases of parenchymatous goitre are entirely limited to the age period from 10 to 25, and that the greatest liability occurs between 15 and 20. The liability to adenomatous goitre increases rapidly after puberty, reaches its maximum between 25 and 30, and then gradually diminishes. The period of greatest liability to adeno-parenchymatous goitre is from 25 to 50 years.

Fig. 4 shows the relative proportion of cases occurring in males and females in the three types of goitre, and shows the marked tendency of goitre to affect women. The 55 cases of adeno-parenchymatous goitre occur exclusively in women. In the cases of adenomatous goitre, out of a total number of 174 cases 17 were in males, 157 in females. The cases of parenchymatous goitre show a distinct difference in this respect. In a total number of 30 cases 11 were males and 19 females, and if we consider only those cases treated in the eight years 1900-7, the proportion is almost equal.

It was thought advisable to combine the study of the histological changes in the thyroid in cases of goitre with the histological examination of thyroid glands obtained from a series of consecutive *post-mortem* cases in which there had been no symptoms during life referable to the thyroid. Sixty of these cases have been examined, and it may perhaps be well to refer here to the appearances met with in some of them. Fig. 5 shows the structure of a normal thyroid from a fetus of four months. The gland is a richly cellular structure and shows very distinctly its subdivision into lobules. Only a few of the vesicles are fully formed and filled with colloid, the majority are extremely small, and are formed of a few cells arranged in a circle round a small central space, and thus show a commencing acinous arrangement.

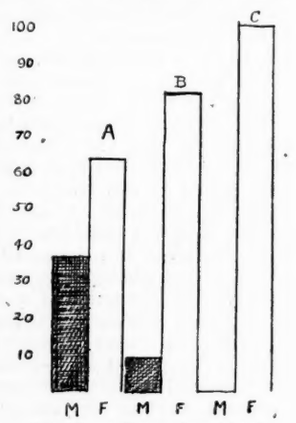

Fig. 4.—A, Parenchymatous goitre; B, adenomatous goitre; C, adeno-parenchymatous goitre.

At birth the gland has practically adult characters. The vesicles are well formed, are filled with colloid and are lined with cubical epithelium. They have no basement membrane and the epithelial cells are in close contact with the capillaries running in the connective tissue. Between the larger vesicles are smaller ones, mostly filled with colloid, a few filled with cells, and in the supporting tissue are small groups of epithelial cells with no definite acinous arrangement and probably representing undeveloped vesicles.

Twenty-three thyroid glands have been examined from children under 15 years of age. In those of children under 2 years the histological appearance is often much altered. In adults and children over 2 years the changes are comparatively slight. Half of the glands from children under 2 years showed marked alterations in

the histological structure. The changes in all cases are somewhat similar, namely, there is absence of colloid, often complete, the vesicles are filled with cells due to proliferation of the lining epithelium, and the whole gland becomes a solid cellular organ and loses to a great extent its vesicular characters. Fig. 6 shows this appearance and is taken from the thyroid of a child, aged 10 months, who died of tuberculous meningitis after four weeks' illness. No miliary tubercles were found in the thyroid. Similar changes have been found in cases of acute nephritis, pneumonia, empyema, broncho-pneumonia, and tuberculous peritonitis.

An explanation of this marked alteration in the thyroid glands in children is difficult. Possibly colloid production takes place in immature glands by the proliferation of the epithelial cells and their subsequent transformation into colloid rather than by the production and discharge of colloid from cells lining the vesicles, and in this way the process would be somewhat comparable with the changes in the breast in an early and late stage of lactation. The changes in adults are extremely slight. In many cases of wasting diseases, such as tuberculosis and carcinoma, the epithelium of the vesicles tends to proliferate, a few of the smaller vesicles being completely filled with cells and the larger ones being lined by a layer of epithelium several cells in thickness. The colloid in all cases is plentiful. It occasionally shows degenerative changes, and is broken into globular masses.

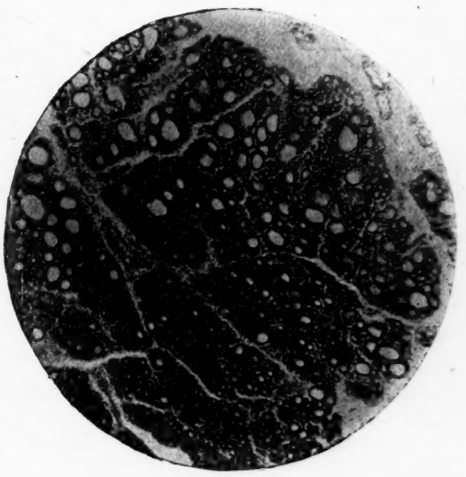

Fig. 5.

Reference must be made to the alterations found sometimes as the result of injury to the gland. Fig. 7 shows the thyroid of a child aged 13 months in whom tracheotomy had been done six days before death. The vesicles are emptied of colloid. They are no longer spherical sacs, but appear as tubular channels with their opposite walls almost in contact. The epithelium is of a high columnar type, and in some places is infolded. All these changes are probably secondary to the empty condition of the vesicles, and resemble very closely the alterations in the vesicles in Graves's disease and in many cases of so-called secondary Graves's disease. Similar changes have been described as occurring in the portion of thyroid gland left after partial thyroidectomy in animals, and have been ascribed to compensatory hypertrophy. It is evident that this conclusion is not justified unless it is shown that the changes persist after the effects of injury and inflammation have passed off.

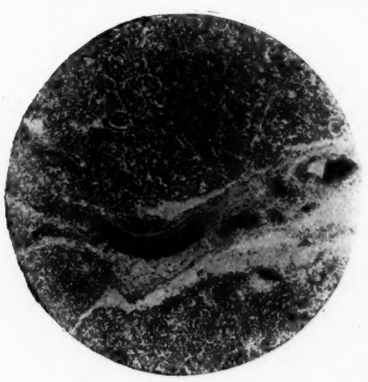

Fig. 6.

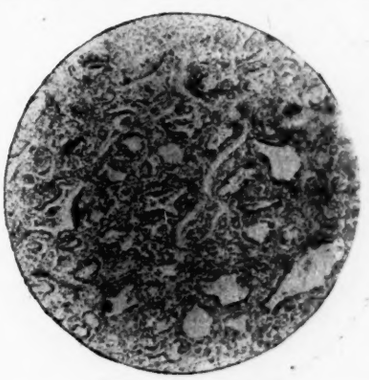

Fig. 7.

The histological structure of the thyroid in goitre cases is conveniently studied in two sections:

1. The structure of the adenomata.
2. The histological changes found in the gland tissue.

The Histological Structure of the Adenomata.—The structure of adenomata of the thyroid is fully described in most textbooks, and need not be given in detail. The variations in structure found in different tumours are closely similar to the structural variations which occur in the normal gland from the early fetal to the adult condition. Seventy-four adenomata have been examined, and are grouped into three varieties:

1. Those having a structure similar to early fetal thyroid tissue, comprising 16 cases.
2. Those composed of large and small vesicles, comprising 33 cases; and
3. Those composed of very large vesicles and usually tending to become cystic, comprising 25 cases.

The fetal adenomata form one-fourth of all the cases examined, and in a few cases occur in very large numbers, scattered through the gland—they are recognizable when extremely small. In a case of adeno-parenchymatous goitre there are in one section, measuring 3 cm. by 2.5 cm., fifteen adenomata of different sizes, the two smallest measuring 1 mm. and 0.4 mm. in greatest diameter (see Fig. 8). I know of no other situation, except perhaps the uterus, where innocent tumours can be detected at such an early stage. They apparently grow from a very small focus, push aside the surrounding structures, and cause no reaction in the tissues around. My own impression is that they are of local metastatic origin. An interesting feature in connexion with this possibility is that in some of the adeno-parenchymatous goitres it is common to find an old partially calcified adenoma in a gland containing numerous small soft encapsuled masses, to the growth of which the recent enlargement of the goitre is due.

In the second group the similarity in structure to normal thyroid gland tissue is very marked, and the only means of distinguishing them histologically is by the arrangement of the connective tissue. In thyroid gland tissue it is always possible to recognize that the gland is divided into lobules (see Fig. 5). The connective tissue in adenomata, on the other hand, has no regular distribution, and shows no attempt at lobulation (see Fig. 9). Colloid adenomata, in a stage when they are smaller than the lobules of the gland, are, I think, impossible to distinguish with certainty.

The Histological Changes in the Gland Tissue in Certain Cases of Goitre.—The changes in the thyroid in the cases to be next considered are of special interest in connexion with the question of the relation of primary Graves's disease to other forms of goitre, and especially the so-called secondary Graves's disease, and they will be considered in detail.

CASE I.

F., aged 48. She had noticed gradual enlargement of the neck for eighteen months, and had some dyspnoea and dysphagia.

On admission, there was uniform enlargement of the right lobe of the thyroid. It was hard, lobulated, and had displaced the trachea slightly to the left. There was no pain or tenderness, no exophthalmos, no tremors, and the vocal cords were normal. The pulse-rate was not increased. Operation on August 31st, 1908, by Mr. Legg. The right lobe and isthmus were removed and an adenoma enucleated from the left lobe. The patient is now, one year later, quite well.

The specimen weighs 59 grams and measures 7.5, 4, and 4 cm. in its longest diameter. The outer surface is smooth, pale, and shows the lobules of the gland very distinctly. The cut surface is everywhere opaque and white. There are several adenomata—the largest in the isthmus is 3.5 cm. in diameter. On

Fig. 8.

microscopic examination the gland is hardly recognizable. The interstitial tissue is everywhere densely packed with small round cells (Figs. 10 and 11). The vesicles contain no colloid, and in many places are represented by groups of cells, which have lost their acinous arrangement and are widely separated from adjoining vesicles by tracts of interstitial tissue filled with round cells. The cells are chiefly plasma cells—a few are lymphocytes. Some endarteritis is present. The whole of the right lobe of the thyroid is in a similar condition. The changes are somewhat comparable with those in myxoedema, except that the thyroid is enlarged and not atrophied. The absence of symptoms can perhaps be explained by the fact that

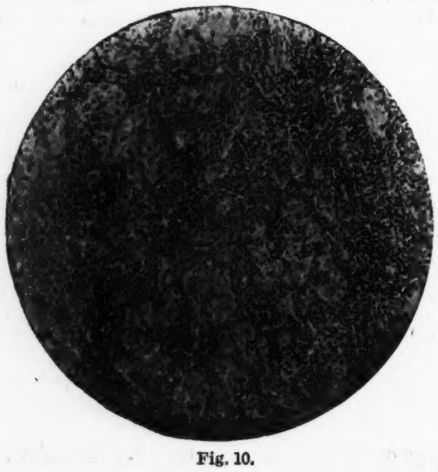

Fig. 10.

he left lobe was possibly healthy, and the glandular tissue in the right lobe is so much atrophied that symptoms of hyperthyroidism would not be likely to occur. This patient has recently developed symptoms of cachexia strumipriva.

CASE II.

F., aged 19. She had always noticed a swelling in her neck. For three years she had been nervous, shaky, and restless, with palpitation, especially at night. She had dyspnoea on exertion. On admission she was well nourished, restless, and had fine tremors of hands and tongue. There was no exophthalmos, and von Graefe's and Stellwag's signs were absent. Pulse-rate, 120 to 132. The vocal cords were normal. The thyroid was symmetrically enlarged, involving both lobes and isthmus. It was firm, smooth, uniform in consistence, and pulsated.

Operation on August 17th, 1908, by Mr. Legg. Extirpation of the right lobe. The specimen weighs 100 grams, and measures 9, 5, and 5 cm. in widest diameters. The outer surface is smooth, pale, and covered with fascia. The cut surface is white, opaque, contains little colloid, and no encapsuled masses. The lobe is not uniformly affected, and towards the posterior border of the gland the tissue contains colloid and is translucent.

On microscopic examination, the structure in most places is that of a Graves's disease thyroid. The vesicles are tubular, show infoldings of the walls, and are lined with columnar epithelium. In other sections the appearances are somewhat similar to the last case. There is round-celled infiltration of the interstitial tissue, tending to be most marked in localized areas, and spreading from these into the surrounding connective tissue and vesicles. The cells towards the centre are lymphocytes, those around are chiefly plasma cells.

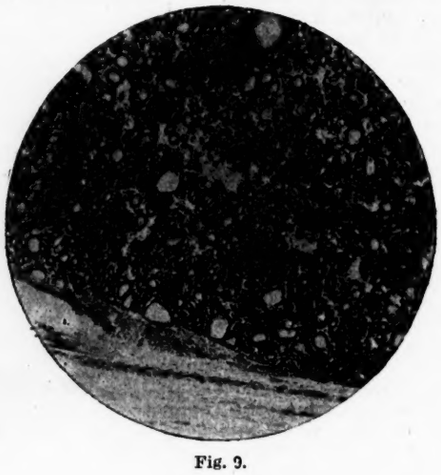

Fig. 9.

CASE III.

F., aged 23. Enlargement of neck noticed for two years, with nervous symptoms and trembling of the hands. She had had dyspnoea on exertion for six months. On admission she was well nourished; there was slight exophthalmos and fine tremors of both hands. Pulse 96 to 112. The thyroid was uniformly enlarged, the swelling involving both lobes and isthmus. Operation, May 10th, 1909, by Mr. Berry. Resection of the right lobe.

The specimen weighs 36 grams. The macroscopic changes are striking. There are localized white opaque areas scattered through the whole lobe, some larger than others, the smaller ones looking like rather large miliary tubercles. The intervening tissue contains colloid, and has the translucent appearance of normal thyroid gland tissue. On microscopic examination the opaque areas show the typical changes of Graves's disease. The vesicles are tubular, empty, and are lined with high columnar epithelium. In the centre of these areas there is a local accumulation of round cells similar to those of Case II, and, like these, containing many plasma cells (Fig. 12). The feature of chief importance is that the change is definitely a focal one affecting small areas of the gland tissue. The clinical aspect of this case is that of primary Graves's disease.

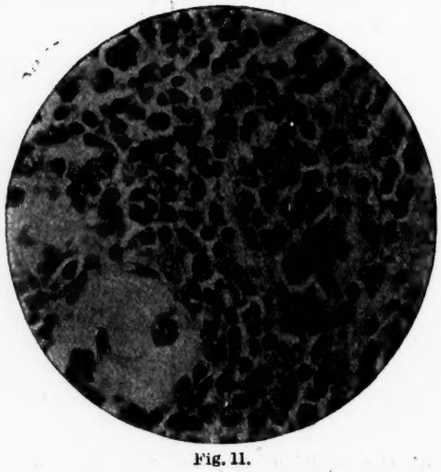

Fig. 11.

CASE IV.

F., aged 48. A slight swelling on the right side of her neck noticed for a year; some discomfort and shortness of breath. She was stout, extremely nervous, but otherwise healthy. Deeply seated in the right lobe of the thyroid, and low down, was a rounded swelling the size of a walnut. Pulse 68 to 80. She had no exophthalmos. Operation, June, 1907, by Mr.

Berry. Resection, enucleation of an adenoma from the right lobe. The specimen is a solid adenoma of the thyroid, 4 cm. in diameter, with an attached piece of gland tissue. It weighs

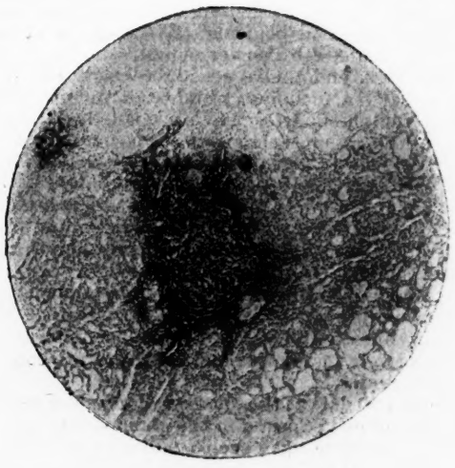

Fig. 12.

18 grams. The adenoma is of the fetal type. The chief interest in this case is in the changes in the gland tissue.

Fig. 13 shows a photograph of the section. Scattered through the gland are many large, deeply-staining areas, somewhat similar in structure to lymph germinal areas (see Fig. 14). Each consists of a central faintly-staining part, and and an outer deeply-staining zone. The cells in the centre show mitotic division, and appear to be derived from included cells of the glandular epithelium. The cells of the outer zone are mostly lymphocytes, towards the periphery they are intermingled with plasma cells.

Fig. 13.

Changes of a similar kind but to a slighter degree have been found in many cases, chiefly in cases of adeno-parenchymatous goître.

The points I wish to raise in connexion with these cases are:

1. That the condition of the vesicles of the thyroid gland in some forms of inflammation, such as follows a tracheotomy wound, may be identical with that found in cases of Graves's disease.

2. That primary Graves's disease is occasionally found to occur associated with changes in the thyroid which are focal in character.

3. That in other forms of goître than Graves's disease—namely, adenomatous and adeno-parenchymatous—the presence of nervous symptoms is commonly associated with the occurrence of histological changes in the thyroid gland tissue consisting of local accumulations of round cells and alteration to a more or less extent in the surrounding vesicles.

4. That in certain forms of goître—for example, Case I—the histological characters are such as to suggest a diffuse chronic inflammatory condition—namely, marked plasma cell infiltration and endarteritis; and that in other cases, including some of Graves's disease, similar changes are found in localized areas.

As to the cause of these changes I may perhaps be allowed to speculate. In Case I the histological picture closely simulates that occurring in certain protozoal infections, and particularly syphilis. The changes in the other cases are similar but focal and less marked.

Many attempts have been made to find evidence of organism infection. Several hundred sections have been made in some of the cases, and have been treated by various methods for staining organisms in tissues. Bacteriological examination, including animal inoculation, has been made in a few cases. For undertaking the latter I wish to express my thanks to Mr. A. G. R. Foulerton. The results have been entirely negative. Nevertheless, the histological characters suggest a toxic substance present in the thyroid gland, in some cases diffuse, in others localized. As to the nature and origin of this substance we are at present entirely in the dark.

Fig. 14.

REFERENCES.
[1] *Proceedings of the Royal Society of Medicine*, 1907. [2] *Archives of the Middlesex Hospital*, vol. xv, 1909. [3] *Vital Statistics*, Newsholme 1889.

In reply to a question regarding examination of faeces, Dr. Chambers said that she had examined for amoebae in a few cases, but none had been found. Evidence derived from examination of faeces seems, however, of little value in determining whether an infective agent gains access to the thyroid gland. Of more value was the examination of material removed by operation in the surgical treatment of goître, and especially in those cases in which symptoms of hyperthyroidism were present. The chief difficulty which had to be contended with seemed to be the late stage at which the disease was usually treated by operation. Nearly all the cases were of several years' duration, and she could imagine a condition similar to that in syphilis in which organisms were present in greatest numbers in an early stage, and were comparatively scanty when the disease was of some standing.

ON THE ABSENCE OF ALTMANN'S GRANULES FROM CELLS OF MALIGNANT NEW GROWTHS.

By HENRY BECKTON, M.A., M.D., B.Sc.
(From the Cancer Research Laboratories of the Middlesex Hospital.)

I.—INTRODUCTION.

In various cell species, such as the coarsely-granular and finely-granular eosinophile leucocytes, discrete granules are seen on microscopic examination so long as the cells are living and unstained. Under similar conditions the protoplasm of the bodies of other cells (for example, liver, kidney) appears to be *granular* rather than to contain well-marked granules; and in others, again, the cell body is seen to be entirely free from any appearance of granularity.

On submitting tissues to the action of various reagents, however, discrete granules can be demonstrated in a much wider range of cell species. Thus, Altmann, using as a fixing fluid a mixture of equal parts of 5 per cent. potassium bichromate and 2 per cent. osmic acid (both in aqueous solution), and subsequently imbedding in paraffin, staining with anilin acid-fuchsin, and differentiating with picric acid alcohol, found granules in a large variety of

cells; these granules are variously known as Altmann's granules, fuchsinophile granules, and plasmasomes.

In a paper recently published in the *Archives of the Middlesex Hospital* I arrived at the following conclusions:

1. Most kinds of normal cells show Altmann's granules.
2. In inflammatory conditions these granules are present in the various cell species concerned.
3. In all innocent neoplasms examined granules were present in the cells.
4. In malignant new growths granules tend to disappear, or are absent altogether from the particular type of cell involved.

It is with this last conclusion that the present paper is chiefly concerned.

II.—Method of Investigation.

The method which I have employed during the research is as follows:

1. Take small pieces of tissue as soon as possible after an operation.
2. Place in formol-Müller (1 in 49) at room temperature for one week, renewing the solution on the second and fourth days, and then in Müller's fluid for another week. Usually for very very small pieces, 1 mm. thick, three days are sufficient.
3. Wash overnight in running water; a few hours is sufficient time for very small pieces.
4. Alcohol in increasing concentration; cedar-wood oil or xylol; paraffin, 57° C.
5. Cut sections not thicker than 5 μ and mount on slides.
6. Xylol; absolute alcohol. Rinse in water.
7. Stain in anilin acid-fuchsin.
8. Differentiate with picric acid alcohol or with aqueous solution of sodium bicarbonate (1 in 10,000).
9. Absolute alcohol; xylol; Canada balsam.

The stain is prepared thus: To 100 c.cm. of filtered cold saturated watery solution of anilin add 20 grams of acid-fuchsin; shake well and filter.

The picric acid alcohol is made by adding seven volumes of 20 per cent. alcohol to one volume of saturated picric acid solution in absolute alcohol.

The process of staining may be carried out at room temperature, the slide being placed vertically in the staining fluid for, say, half an hour. This method is free from any objection which may be urged against the use of a hot staining fluid. I find, however, that the following method gives the same results and is most expeditious and convenient. Cover the section with staining fluid, and this in turn with a watch-glass, and heat for two minutes to about 60° C., using either a thermostat or a strip of copper heated at one end and tested from point to point by means of a piece of paraffin wax.

Next pour off the stain, blot, and differentiate; a point is soon reached at which but little further colour comes away. As a rule, at ordinary temperatures differentiation is complete with picric acid alcohol in about two minutes, and with sodium bicarbonate in about half a minute.

It may be noted here that absolute alcohol does not decolorize a section, but dilute alcohol discharges the colour rapidly, while plain water removes it but slowly, and indeed differentiates sufficiently to enable one to detect the presence of granules. Again, while in moderately dilute mineral acids the colour remains in a section for a long period, moderately dilute alkalis rapidly discharge it, and very dilute alkalis may be used as differentiating fluids.

After fixation with formalin alone, as well as after formol-Müller solution, granules can be demonstrated in the essential cells of pancreas, submaxillary gland, liver, kidney, columnar epithelium of the alimentary tract, etc.; but this is not the case with lymphocytes, plasma cells, endothelial cells, fibroblasts, fat-cells, etc., which show granules only after fixation with formol-Müller. It thus appears that the granules shown by this method may be appropriately referred to as belonging to a "gland cell group" and a "connective tissue cell group" respectively.

III.—The Granules in Normal and Pathological Conditions.

A detailed account of the granules in normal cells is given in earlier papers; it is necessary here only to refer to them very briefly. As a convenient standard in estimating the size of the granules generally those of eosinophile cells have been taken. These are found not only here and there in small blood vessels, but also fairly frequently in the tissues.

In the submaxillary gland and the pancreas the granules are on an average larger than eosinophile granules, but are very variable in size; in the liver and in the secreting portions of the kidney they are also large. (In the conducting tubules the cells are almost or entirely free from granules.) The cells of the thyroid gland contain decidedly smaller and fewer granules, as is also the case with the cells of the sweat and mammary glands. In the columnar epithelium of the intestine the granules are very small but numerous, especially in the basal portions of the cells, while in the columnar epithelium of the endometrium and in that lining the gall bladder and the ducts of various glands the granules are also very small.

Lymphocytes, endothelial cells, fibroblasts, and fat cells contain usually a moderate number of minute granules, but rarely in lymphocytes and occasionally in the other cell species the granules are larger. Plasma cells, as a rule, contain fairly large granules—that is, nearly as large as those of eosinophile cells—in moderate number.

From squamous epithelium, Altmann's granules, as opposed to pigment-hyalin and kerato-hyalin granules, are entirely absent. To this statement only rare and partial exceptions have been observed, a few minute granules having been found in the basal layer of the epidermis, and in this situation only. Striped muscle fibres show lines and bands composed of dots and short rods respectively; unstriped muscle fibres are completely devoid of granules.

It is to be noted that the number of granules present in a given kind of cell appears, in the gland cell group at any rate, to be dependent upon such conditions as cell activity and cell nutrition at the time at which the tissue is placed in the fixing fluid. It may also be conveniently stated here that *post-mortem* changes exercise a marked effect on the granule appearances, for while gland cells are moderately resistant to these changes, so that granules can still often be shown in them, *post-mortem* tissues are almost absolutely useless for the demonstration of granules of the connective tissue cell group.

Inflammatory Conditions.

In addition to cells containing eosinophile and basophile granules the chief cell species here concerned are lymphocytes, plasma cells, endothelial and endothelioid cells, giant cells, and fibroblasts. All these have been found to show Altmann's granules in every case investigated, including acute abscess, chronic mastitis, tuberculous disease, and other chronic inflammatory states; moreover, granules are well shown in the chronic inflammatory (or precarcinomatous) conditions seen at the edge of the new growth in many cases of malignant disease.

The New Growths.

The following description as regards Altmann's granules is based upon an examination of 52 cases, of which the histological appearances are shown in the following list:

A.—*Non-malignant New Growths.*
Adenoma: Thyroid, 6; prostate, 1.
Adenomyoma: Uterus, 1.
Fibro-adenoma: Breast, 1.
Papilloma: Bladder, 1.
Duct papilloma: Breast, 2.

B.—*New Growths of Doubtful Malignancy.*
Neoplasms of orbit, 1; ovary, 1; thyroid, 1.

C.—*Malignant New Growths.*
Carcinoma, spheroidal cell: Breast, 13.
Carcinoma, squamous cell: Cervix uteri, 4; anus, 1; skin, 2; lip, 3; tongue, 1.
Carcinoma, columnar cell: Corpus uteri, 3; rectum, 1; caecum, 1; breast, 1.
Sarcoma, melanotic: Vulva, 1.
Sarcoma, small round-cell: Thyroid, 1.
Endothelioma: Breast, 4; orbit, 1.

A.—*Non-malignant New Growths.*

In all of the cases granules were present in the cells of new growth—in the thyroid in greater numbers than in the normal tissue, though of about the same size; in the duct papilloma in very large numbers and of great size; in the remaining instances the granule appearances resembled those of the normal tissues.

B.—*New Growths of Doubtful Malignancy.*

1. *Orbit.*—In this case a section was seen microscopically to present the appearances of lymphoid tissue, and the cells composing this both as regards granules and in other respects closely resembled ordinary tissue lymphocytes.

2. *Ovary.*—The new growth in this case was a papilliferous cystadenoma, in which most of the cells showed many round granules.

3. *Thyroid.*—This showed extensive irregular proliferation of epithelial cells which contained granules of about the same size as in the normal tissue, but in greater numbers.

C.—*Malignant New Growths.*

1. *Spheroidal-cell Carcinoma.*—In this group of cases of malignant disease either no granules were found in the cancer cells or they were present only in small numbers in few of them. This statement applies to metastases in the axillary lymphatic glands as well as to the primary growth itself. One exception was found, however, in which granules, though present in only a small number of the cancer cells, formed a striking picture, the cells containing them occurring for the most part only in finger-like processes of new growth or at the margins of rather large cell masses.

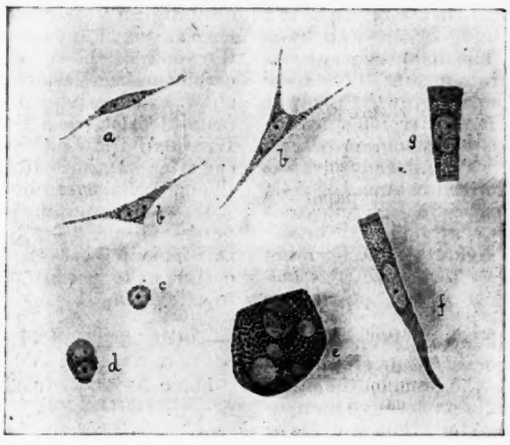

Fig. 1.—Cells from various tissues, showing Altmann's granules. *a*, Endothelial cell. *b b*, Fibroblasts. *c*, Lymphocyte. *d*, Plasma cell. *e*, Liver cell. *f*, *g*, Columnar epithelial cells from vermiform appendix and small duct of submaxillary gland respectively.

2. *Squamous-cell Carcinoma.*—In two or three of this group of cases a very few of the cancer cells showed granules, especially at the edge of the cavity in several cell groups undergoing central degeneration. But in the majority of cases of squamous cell carcinoma no granules were found.

3. *Columnar-cell Carcinoma.*—In this group of cases the great majority of the cells contained no granules. Here and there, however, in most of the cases a cancer cell, or group of such cells, showed granules which were few in number and of comparatively large size. Cancer cells resembling in granule appearances the cells of the corresponding normal epithelium were entirely absent.

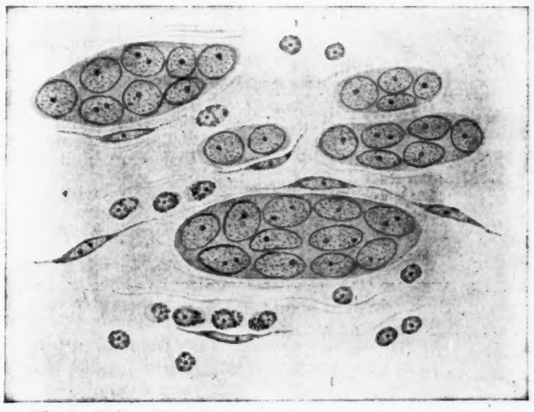

Fig. 2.—Spheroidal-cell carcinoma of breast: Small masses of cancer cells without granules, plasma cells, lymphocytes, etc., with granules.

4. *Sarcoma.*—In the case of melanotic sarcoma the great majority of the cells of new growth contained no granules of any kind, about one-sixth of the total number contained granules of melanin, and a very few showed Altmann granules, distinguishable by their red colour from the brown pigment granules. Here and there a cell contained both melanin and Altmann granules. In the case of small round-cell sarcoma, in which the cells otherwise resembled lymphocytes, there was a marked absence of granules as compared with lymphoid tissue.

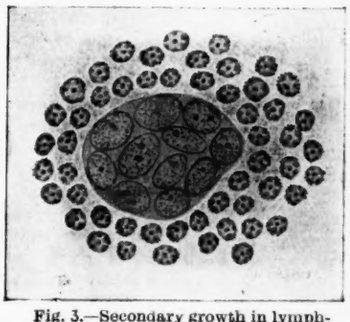

Fig. 3.—Secondary growth in lymphatic glands, from same case as Fig. 2, showing a group of cancer cells surrounded by lymphocytes.

5. *Endothelioma.*—In the cases of endothelioma, granules were small and few in number in 1 case and absent in 3 cases. In the remaining instance, however, granules were numerous; this was a case of perithelioma, in which islets of tissue, well-staining as regards both nuclei and granules, were embedded in a groundwork of necrotic tissue showing neither granules nor nuclear staining.

IV.—CONCLUSION.

The investigation of the question under discussion is still incomplete. The group of sarcomata is very inadequately represented in the foregoing owing to lack of operation material. I should be greatly obliged to any one who would kindly assist in this investigation by sending me a small piece of freshly removed sarcomatous tissue in a small corked bottle, either without any reagent or placed in formol-Müller solution (formalin 2 c.cm., Müller's fluid 98 c.cm.).

Granules, again, have been found in cells of new growths of doubtful or limited malignancy — for example, papilliferous cystadenomata of the ovary—and may prove to be of special interest in these cases.

But as far as the present investigation has proceeded the conclusion may be drawn, as indicated at the beginning of this paper, that "In malignant new growths granules tend to disappear, or to be absent altogether, from the particular type of cell involved."

Thus the cells of malignant neoplasms are not merely cells of normal type occurring in abnormal situations, but differ essentially from these in an important histological respect. This difference may be regarded as an expression of deviation from, or loss of, normal function.

DISCUSSION.

Dr. LAZARUS-BARLOW pointed out that three important considerations suggested themselves from the paper. First, that the carcinomatous cell could not be differentiated from the normal on anatomical grounds was not true, since it was now possible to show, for example, that a cancerous columnar cell differed fundamentally from the columnar cells from which it arose. Secondly, that there was here possibly a hope that a differentiation between inflammatory masses and sarcoma might be rendered possible; and, thirdly, it raised the whole question whether the lymphocyte and the plasma cell might not in reality be of a glandular nature and played an important part in the whole story of internal secretions.

Professor LORRAIN SMITH (Manchester) suggested that attention should be concentrated, in the first instance, on the fixatives used, in order to discover the solubility of the granules and the effect of oxidizing agents, such as bichromate of potash, or permanganate of potash, on them. Their staining reactions with basic and acid dyes, as well as nuclear dyes, should also be carefully compared. The exceptional cases which had been mentioned showed the difficulty of reaching from these results a metabolic theory of new growth.

A CASE OF CANCER OF THE PYLORUS.

By J. LORRAIN SMITH, M.A., M.D.Edin., F.R.S.,
Professor of Pathology, Victoria University of Manchester.

DR. LORRAIN SMITH demonstrated by specimens and lantern slides a case of cancer of the pylorus. The patient, a woman of 35 years of age, had, during the earlier part of

her illness, developed respiratory symptoms in the form of dyspnœa, accompanied by a foul expectoration.

At the *post-mortem* examination the carcinoma was found to occupy the mucous membrane in the region of the pylorus, causing a uniform thickening of the wall by a somewhat translucent new tissue. The diaphragm showed the deposit of flat, scale-like cancerous masses. The liver showed a few small nodules of secondary growth; a few of the retroperitoneal glands in the lumbar region were enlarged, and there was a small mass of tumour growth in the pouch of Douglas. The lung was uniformly invaded by cancerous growth which had formed columns of cells occupying the lumen of the lymphatics to such an extent that their presence could be traced over the pleural surface as a series of delicate lines of yellow colour, forming a meshwork outlining the lobules. The case was one in which an extensive permeation of the pulmonary lymphatics had taken place.

Microscopic sections, of which photographs were shown, demonstrated the presence of mucoid degeneration in the cells of the original tumour. In the lung, on the other hand, there were found in the alveoli an excessive number of cells loaded with globules of myelin. The sections of the bronchial glands showed the presence of myelin masses in the stroma of the gland, but none were found in the areas of lymphoid tissue. Dr. Lorrain Smith finally dealt with the bearing of these facts on observations on tumour metabolism.

X-RAY CARCINOMA.

By C. W. ROWNTREE, M.B., B S.Lond., F.R C.S.Eng.,

Hunterian Professor, Royal College of Surgeons.

THE author stated that 11 cases of *x*-ray carcinoma had occurred in England, but that in America the number had been considerably greater, no less than 20 cases having been referred to in a private letter received from Dr. Porter. Of the English cases only one had had a fatal termination, but in the United States there had been no less than seven fatalities, in some of which there were numerous metastases, and in one remarkable case hardly a viscus in the body was free from secondary growth. Only instances of true *x* ray carcinoma were included—that is to say, carcinoma arising in previously healthy individuals who had in the course of their duties been exposed for lengthy periods to the influence of *x* ray. Cases of lupus vulgaris, and similar conditions which had become complicated by carcinoma were not included.

From a microscopic point of view there was nothing peculiar to this form of cancer. Certain clinical facts seemed, however, of importance:

1. The majority of the individuals were comparatively young men.

2. It would appear from the history of these cases up to date that the condition is less liable to give rise to visceral or glandular deposit, and that surgical operations are less liable to be followed by recurrence than in other forms of squamous cancer.

3. A most important and striking feature is the fact that in no less than 5 of the 11 English cases there were multiple growths, separate and distinct lesions on different fingers or different hands, and in one case on both hands and also on the chin, which had been the seat of chronic *x* ray dermatitis.

It was suggested that these facts indicated that there was something special and peculiar about *x*-ray carcinoma which differentiates it from other forms of cancer. As for etiology, it was asked whether the condition was to be regarded as the result of a special and selective action of one or other or all of the various emanations included in the term "*x* rays," or whether *x*-ray carcinoma was merely a complication of *x*-ray dermatitis, just as squamous cell carcinoma might be, and frequently was, a complication of such widely-varied conditions as lupus, kangri burns, or the senile keratoses so often found in conjunction with the atrophy of extreme senility.

There was evidence, the author thought, in both directions. On the one hand was the fact that the histological picture presented by an advanced case of *x*-ray dermatitis had many features in common with those found in scars, senile atrophy, and chronic inflammations. The subepithelial elastic tissue was diminished or absent, the corium was replaced by a more or less homogeneous granulation tissue, and the epithelium itself underwent irregular changes.

On the other hand was the fact that carcinoma was a vastly more frequent complication of *x*-ray dermatitis than it was of any other precancerous condition; and also the youth of the sufferers and the multiple nature of the carcinomatous lesions. Further, it had been possible to show, by exposing animals to *x* rays, that they exerted a definite selective action upon epithelial structures. Dr. Lazarus-Barlow had shown them a section of a rabbit's ear after exposure to moderate doses of *x* rays in which the epithelial overgrowth was of the most striking nature.

It would appear possible, therefore, that *x* rays do possess some selective action which so disturbs the relationship between the epithelium and its underlying corium as to permit the disorderly overgrowth met with in carcinoma.

ON THE ETIOLOGY OF DYSENTERY.

BY

MARC ARMAND RUFFER, C.M.G., M.D. and J. GRAHAM WILLMORE, M.R.C.S.

(From the Desert Laboratory, El Tor, Sinai.)

DURING every pilgrimage season a large number of pilgrims suffering from dysentery are landed at El Tor, and we have had an opportunity of studying many hundreds of these cases. Basing our division on the presence of certain micro-organisms, we divide them provisionally into the following groups:

GROUP A.—*Amœbic Dysentery.*

(*a*) Cases in which the *Amœba hystolytica* is found in the stools, and in which all the characteristic clinical symptoms and pathological changes of amœbic dysentery are present. This is a very common form.

(*b*) Cases in which the *Amœba hystolytica* is present, and in which the *Bacillus dysenteriæ* El Tor (No. 1) is also found.

GROUP B.—*Bacillary Dysenteries.*

(*a*) Cases in which the Shiga-Kruse bacillus is found in the stool. This is a comparatively rare form at El Tor.

(*b*) Cases in which the *Bacillus pseudo-dysentericus* D (Kruse) is found.

(*c*) Cases in which the *Bacillus dysentericus* (Flexner) is present. We have so far only come across one such case.

(*d*) Cases in which the *Bacillus dysentericus* El Tor No. 1 is found.

(*e*) Cases in which other micro-organisms resembling those mentioned above, but not identical with them, are found. We shall not discuss them in this paper, but we may mention that there are at least two varieties of these micro-organisms.

The point of interest to us is that at El Tor during the yearly epidemics we have to deal with at least seven different dysenteries. This paper is concerned with the description of the Group B (*d*)—namely, the disease caused by the *B. dysentericus* Tor No. 1, which is the most common form of dysentery among Mussulman pilgrims.

Characteristics of B. dysentericus Tor No. 1.—This micro-organism is a short, stumpy bacillus, about two and a half times longer than it is broad. It is about as long, but considerably plumper, than the Shiga-Kruse bacillus. Filaments are rare in any medium, though occasionally forms two or three times longer than the isolated bacillus are seen. The involution forms, especially when the bacillus is grown on potatoes, show a distinct tendency to polar staining.

No spores are found, nor can cilia be demonstrated. When freshly isolated the bacillus performs movements of spiral rotation, so that it appears to be distinctly motile, but no movements of progression are ever observed. Brownian movements are always marked; in subcultures it is quite motionless; in peptone bouillon it grows readily, and renders the medium uniformly turbid. No pellicle is formed.

Gelatine is not liquefied. On gelatine plates the bacillus forms small transparent colonies which are regularly circular at first. The edges then become very finely crenated round a circular nucleus, which is of a darker colour and more granular consistency. The colonies then have the appearance of two concentric circles, and somewhat resemble a grindstone with its centre hole, and are like those described by Chantemesse and Widal in their early paper on dysentery, but widely different from the vine-leaf colonies of the Shiga-Kruse bacillus.

On agar the bacillus forms a transparent film with a finely crenated, slightly raised margin. The film is grey by reflected light, and shows a bluish fluorescence by transmitted light. On Endo plates the colonies are colour-

less, and on Conradi-Drigalski medium they much resemble those of *Bacillus typhosus*. On potatoes, after twelve hours' incubation at 37° C., the bacillus forms a fine, transparent, shining streak, which becomes opaque later on, turning a dirty greyish-white colour at first, and a muddy lemon-yellow afterwards. The colour remains deeper in the centre, whereas the margin remains greyish-white, sending off fine, irregular, greyish-white lateral offshoots.

Table I shows the bio-chemical reactions, in relation to such of the more important sugars and alcohols as were at our disposal, and to litmus milk, of the following bacilli:

1. Six specimens of *B. dysentericus* Tor No. 1 which had been isolated from 6 different patients.
2. *B. pseudo-dysentericus* D obtained from Professor Kruse, and three specimens of this bacillus isolated from different cases at El Tor.
3. Flexner's bacillus and another specimen isolated at El Tor.
4. *B. pseudo-dysentericus* A obtained from Professor Kruse.
5. A specimen of the Shiga-Kruse bacillus isolated at El Tor.

The method employed was to make stab cultures into glucose-free peptone-litmus-agar tubes to which the appropriate reagent had been added; two tubes of each were inoculated and placed in the incubator at 37°, together with two sterile controls. The tubes were then compared after twenty-four hours, three days, six days, and twelve days. Finally, the agar was melted at 99° C., poured into *old* sterile Petri dishes, and compared with the controls similarly treated.

In these tables where the inoculated tubes were more acid than the control, the ratio of acidity is expressed approximately by the *plus* sign followed by a figure, the ratio of alkalinity being similarly shown by a *minus* sign followed by a figure.

The letter V (variable) denotes that the reaction is inconstant.

The mono-saccharides, dextrose, laevulose, and galactose, are not included in the table, as well-marked acidity is produced in all three by all the bacilli enumerated. No gas is formed at any time in any saccharide, mannite, sorbite, or salicin.

We need not go into the details of the results obtained, as a mere glance at Table I is sufficient to show that, with the single exception of mannite, and possibly litmus milk, they may be expressed in one word—chaos, at least, as far as any differentiating reactions are concerned. As already pointed out by Lentz and others, the Shiga-Kruse group is sharply differentiated from the other dysentery bacilli by its inability to produce acid in mannite.

With regard to the litmus milk, it will be noticed that all the dysentery bacilli—with the exception of the pseudo D group—first acidulate this medium; the maximum amount of acidity appears to be produced after forty-eight hours' incubation at 37°C. A phase of increasing alkalinity then sets in, so that at the end of ten days the milk is more alkaline than a control non-inoculated tube placed under the same conditions. Even to this general rule one of the El Tor No. 1 bacilli (No. 22 in the register) shows an exception by remaining permanently acid.

At no time is the milk coagulated. In the case of the pseudo D group the milk becomes progressively more alkaline without the preliminary acidulation. An analogous reaction—acidulation, and then alkalinization—was noticed not infrequently with maltose, occasionally with saccharose, sorbite, and salicin. In each case the acid production was more marked at the bottom of the tube, and would therefore appear to be favoured by anaërobic conditions.

The fermenting power of these dysentery bacilli seems also to be influenced by their origin and their environment; not only does it vary with different species, but even with different cultures of the same race.

A prolonged period of saprophytic existence—particularly if this be spent on fermentable sugars—appears to result in increased fermenting power, which, as a general rule, varies inversely with the virulence of the organism. For these reasons we are of opinion that the value of this method of investigation lies in its theoretical rather than its practical application; further, it has the disadvantage of being extremely tedious.

A small amount of indol is formed sometimes, but the reaction is not constant.

Pathogenic Action.

Rabbit.—The freshly isolated bacillus, injected intravenously or intraperitoneally, is highly pathogenic to rabbits, death following the inoculation after a period varying from twenty-four hours to five days, according to the dose inoculated. The symptoms are fever, diarrhoea, and paralysis. In some experiments the stools were muco-purulent in character. The most marked pathological changes are intense congestion, swelling, oedema, and numerous petechial haemorrhages in the walls of the large intestine. In a few cases definite small ulcerations of the large intestine were produced. The virulence of

TABLE I.

	Saccharose.				Maltose.				Salicin.				Sorbite.				Dextrin.				Litmus Milk.				Mannite-Agar.	Mannite-Neutrose-Bouillon.	Inulin.
	24 Hours.	3 Days.	6 Days.	12 Days.	24 Hours.	3 Days.	6 Days.	12 Days.	24 Hours.	3 Days.	6 Days.	12 Days.	24 Hours	3 Days.	6 Days.	12 Days.	24 Hours.	3 Days.	6 Days.	12 Days.	24 Hours.	2 Days.	3 Days.	12 Days.	24 Hours.	24 Hours.	12 Days.
B. Tor, No. 1	0	0	0	−1	+1	+2	+2	+2	0	0	0	−1	0	0	0	0	0	+1	+1	+1	+½	+2	0	−4	+1	+2	0
39 ,, ...	+3	+4	+4	+4	0	0	0	0	0	0	0	−1	0	0	+1	+2	0	0	0	0	+½	+2	0	−4	+1	+2	0
167 ,, ...	0	+2	+2	+3	0	+1	+1	−1	0	0	0	−1	0	+1	+1	+2	0	0	0	0	+½	+1	−½	−4	+1	+2	0
22 ,, ...	+½	+2	+2	+3	0	+2	+1	V	+1	+1	0	0	0	0	+1	−1	0	+½	0	+3	+½	+3	+4	+3	+1	+2	0
Ret. ,, ...	0	0	0	V	0	0	0	−1	0	0	0	0	0	0	0	−1	0	0	0	0	+½	+2	0	−4	+1	+2	0
44 ,, ...	0	0	+1	0	0	+½	+½	−1	0	0	0	0	0	0	+½	−1	0	+2	+2	+3	0	0	−2	−3	+1	+2	0
B. pseudo D (Kruse)	0	V	V	V	0	0	0	0	0	0	0	0	0	0	0	−1	0	+1	+1	+2	0	0	0	−4	+1	+2	0
68 ,, ,, ,, ...	0	0	0	−1	+½	+1	+1	+3	0	0	0	0	0	0	0	−1	0	+2	+2	+3	0	0	0	−4	+1	+2	0
2 Up ,, ,, ...	0	+½	+1	−1	+½	+½	+1	−½	0	0	0	0	0	+2	+2	+3	0	+2	+2	+2	0	0	0	−5	+1	+2	0
37 ,, ,, ,, ...	0	+½	+½	−1	0	0	+1	−½	0	0	0	0	0	+2	+2	+3	0	+2	+2	+2	0	0	0	−4	+1	+2	0
B. (Flexner)	0	0	0	−1	0	+2	+2	+3	0	+1	0	0	0	0	0	−1	0	+2	+2	+3	+½	+2	0	−4	+1	+2	0
B. 4 Up ,, ...	0	+½	+1	+½	0	+2	+2	0	0	0	0	−½	0	0	0	−½	0	+2	+2	+2	+½	+½	0	−4	+1	+2	0
B. pseudo A	0	+1	+1	+2	0	0	0	−1	0	0	0	0	0	0	0	−½	0	0	0	0	+½	+1	0	−4	+1	+2	0
B. (Shiga)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	−1	0	0	0	0	+½	+2	0	−4	0	0	0

this organism for rabbits is far less durable than that of the Shiga-Kruse bacillus, and quickly disappears in subcultures.

Guinea-pig.—The guinea-pig is even more readily susceptible to infection by this organism than is the rabbit. The clinical symptoms and *post-mortem* appearances are almost identical with those mentioned as occurring in the rabbit; but, in addition, broncho-pneumonia of greater or lesser extent is an almost constant feature in guinea-pig infection, whilst a markedly haemorrhagic exudation into the peritoneal cavity follows both intravenous and intraperitoneal injections.

Horses.—Small doses of sterilized bacillary emulsion injected into horses produce: (1) Oedema near the point of inoculation, which may extend a good deal; when the horse is inoculated in the shoulder, for instance, the entire leg becomes oedematous; (2) general ill health, as evidenced by anorexia and loss of spirits; (3) fever amounting to 2° C., and lasting about forty-eight hours. None of the cultures used so far produced a soluble toxin.

Man.—Neither by the clinical signs nor by pathological appearances after death were we able so far to differentiate the cases infected by this bacillus from those in which the Shiga-Kruse bacillus was present. The only sure diagnostic sign was the serum reaction; the serum of the patient agglutinating the *B. dysentericus* Tor No. 1, but not the Shiga-Kruse bacillus. This agglutinating reaction is constant, except in early acute or in very feeble old cases, when it may be, and in fact often is, temporarily absent. As the patient recovers, the agglutinating index may rise to 1 in 300 without the exhibition of any therapeutic serum. We have seen, for instance, the agglutinating index of a patient, who had this bacillus in the stools, rise from 1 in 25 to 1 in 300 as he improved.

Cross Immunization.

A single injection of *B. pseudo-dysentericus* D. protects rabbits against the minimum fatal dose of *B. dysentericus* Tor No. 1, and, conversely, the injection of the latter bacillus protects a rabbit against the minimum fatal dose of the other micro-organism. The two bacilli cannot therefore be distinguished by this method.

Contrariwise, the inoculation of *B. dysentericus* Tor No. 1 gives no protection against the Shiga-Kruse bacillus and vice versa.

Action of Serums Artificially Prepared.

We have stated already that at El Tor several types of dysenteric bacilli were present. Thus we have found, very rarely it is true, the Shiga-Kruse bacillus in the stools of dysenteric patients. In 3 cases we have discovered a micro-organism giving all the reactions of *B. pseudo-dysentericus* D (Kruse) (these bacilli are entered in the register under the names: B. 68, B. 2 Up, B 37), and, thanks to Professor Kruse's kindness, we were able to compare them with one of his original cultures, as well as with *B. pseudo-dysentericus* A. In 1 case, also, we isolated a bacillus (B. 4 Up, in register) which had all the characteristics of *B. dysentericus* (Flexner). Serums were prepared by injecting rabbits with *B. dysentericus* Tor No. 1, Flexner's bacillus, *B. pseudo-dysentericus* D, and we also used, for purposes of comparison, a serum kindly given us by the Milan Serum Institute, and which was specific for the Shiga-Kruse bacillus. All these serums were tested on six specimens of *B. dysentericus* Tor No. 1, which had been isolated from six different patients (names in register I., R.E.T., 39, 22, 44, Aut. 167) and all the micro-organisms mentioned above.

Table II gives the result of these experiments.

The table shows that *B. pseudo-dysentericus* D and *B. dysentericus* Tor No. 1 are both agglutinated, and to an almost equal degree, by the serum of rabbits inoculated with either bacillus. On the other hand, these bacilli are not agglutinated by the higher dilutions of Serum Flexner, Serum Shiga-Kruse, or Serum *pseudo-dysentericus* A.

B. dysentericus (Shiga-Kruse) is agglutinated only by the Milan Institute serum. Flexner's bacillus (including B 4 Up) is agglutinated by the lower dilutions of serums Tor No. 1 and *B. pseudo-dysentericus* D. only, but is agglutinated by higher dilutions of Serum Flexner and Serum *pseudo-dysentericus* A; and the same is the case with

TABLE II.

Name in Register.		Serum 1 in 50.					Serum 1 in 100.					Serum 1 in 200.					Serum 1 in 500.					Serum 1 in 1,000.					Serum 1 in 2,000.				
		T. S.	Ps. D. S.	F. S.	M. I. S.	Ps. A. S.	T. S.	Ps. D. S.	F. S.	M. I. S.	Ps. A. S.	T. S.	Ps. D. S.	F. S.	M. I. S.	Ps. A. S.	T. S.	Ps. D. S.	F. S.	M. I. S.	Ps. A. S.	T. S.	Ps. D. S.	F. S.	M. I. S.	Ps. A. S.	T. S.	Ps. D. S.	F. S.	M. I. S.	Ps. A. S.
I.	*Bacillus dysentericus* Tor No. 1	+3	+3	+3	+1	+2	+3	+3	+3	−	±	+3	+3	±	−	−	+3	+3	−	−	−	+3	+3	−	−	−	+3	+3	−	−	−
R. E. T.	„ „	+3	+3	+3	+2	+3	+3	+3	+3	+1	−	+3	+3	+1	−	−	+3	+3	−	−	−	+3	+3	−	−	−	+3	+3	−	−	−
33	„ „	+3	+3	+3	+1	+3	+3	+3	+3	−	+2	+3	+3	+2	−	+2	+3	+3	−	−	−	+3	+3	+1	−	−	+2	+2	−	−	−
22	„ „	+3	+3	+3	+1	−	+3	+3	+2	−	−	+3	+3	+2	−	−	+3	+3	−	−	−	+3	+3	−	−	−	+3	+3	−	−	−
44	„ „	+3	+3	+3	+2	+3	+3	+3	+3	+1	±	+3	+3	+3	−	−	+3	+3	−	−	−	±	+1	−	−	−	−	±	−	−	−
Aut. 167	„ „	+3	+3	+3	+3	+3	+3	+3	+3	+1	±	+3	+3	+3	−	−	+3	+2	±	−	−	+3	−	−	−	−	±	−	−	−	−
—	*Bacillus pseudo-dysentericus*, D (Kruse)	+3	+3	+3	±	+2	+3	+3	+3	−	−	+3	+3	+3	−	−	+2	+3	−	−	−	+1	+3	−	−	−	±	+2	−	−	−
68	„ „	+3	+3	+3	+1	−	+3	+3	+3	−	−	+3	+3	+2	−	−	+3	+3	+1	−	−	+2	+3	−	−	−	+1	+3	−	−	−
2 Up	„ „	+3	+3	+2	±	+2	+3	+3	+2	−	−	+2	+3	+2	−	−	+1	+2	±	−	−	±	+1	−	−	−	−	±	−	−	−
37	„ „	+3	+3	+3	±	±	+2	+3	+2	−	−	+2	+3	±	−	−	+1	+3	±	−	−	−	+2	−	−	−	−	+1	−	−	−
—	Flexner	−	+3	+3	+1	+3	−	+3	+3	±	+3	−	+3	+3	−	+3	−	+2	+3	−	+3	−	−	+3	−	+3	−	−	+2	−	0
4 Up	„	−	+3	+3	+3	+3	−	+3	+3	+1	+3	−	+3	+3	−	+3	−	+3	+3	−	−	−	+3	+3	−	−	−	+2	+1	−	−	−
—	*Pseudo-dysentericus*, A (Kruse)	+3	+3	+3	+3	+3	−	+3	+3	0	+3	−	+2	+3	0	+3	−	+2	+3	0	+3	−	0	+3	0	+2	−	0	+2	0	−
—	*Bacillus dysentericus* (shiga-Kruse)	+1	+2	−	+3	−	−	+2	−	+3	−	−	+1	−	+3	−	−	−	−	+2	−	−	−	−	±	−	−	−	−	−	−

T. S.=Serum of rabbit inoculated with *Bacillus dysentericus* Tor No. 1.
Ps. D. S.=Serum of rabbit inoculated with *Bacillus pseudo-dysentericus* D (Kruse).
F. S.=Serum of rabbit inoculated with Flexner's bacillus.
M. I. S.=Serum from the Milan Institute prepared by injection of *Bacillus dysentericus* (Shiga-Kruse).
Ps. A. S.=Serum from rabbits inoculated with *Bacillus pseudo-dysentericus* A (Kruse).

TABLE III.

Name in Register.		Serum Tor + B. Tor.			Serum Tor + *B. Pseudo* D.			Serum *Pseudo* D + *B. Pseudo* D.			Serum *Pseudo* D + *B.* Tor.			Serum *Pseudo* D. +4 Up (Flexner).			
		1 in 200	1 in 500	1 in 1,000	1 in 200	1 in 500	1 in 1,000	1 in 200	1 in 500	1 in 1,000	1 in 200	1 in 500	1 in 1,000	1 in 200	1 in 500	1 in 1,000	1 in 2,000
I.	*Bacillus dysentericus* Tor No. 1 ...	−	−	−	+3	+3	+	+	−	−	−	−	−	+3	+3	+3	+2
R. E. T.	„ „ „ ...	−	−	0	+3	+3	0	+	−	0	−	−	−	0	0	0	0
39	„ „ „ ...	−	−	0	+3	+3	0	−	−	0	−	−	−	0	0	0	0
22	„ „ „ ...	−	−	0	+3	+3	0	−	−	0	−	−	−	0	0	0	0
44	„ „ „ ...	−	−	0	+2	−	0	−	−	0	−	−	0	0	0	0	0
167	„ „ „ ...	−	−	0	+3	+3	0	−	−	0	−	−	0	0	0	0	0
—	*Bacillus pseudo-dysentericus* D (Kruse)	±	−	−	−	−	0	−	−	−	+3	+3	+3	+3	+3	+3	+2
68	„ „ „ ...	−	−	0	+2	+1	−	+1	±	0	+2	+1	0	0	0	0	0
2 Up	„ „ „ ...	−	−	0	−	−	0	+1	+1	−	+1	−	0	0	0	0	0
37	„ „ „ ...	+	±		−	−	0	−	−	0	+?	+1	−	0	0	0	0
4 Up	(Flexner)							±	−	−	+3	+3	+2	−	−	−	−

A. Serum Tor + *B.* Tor = serum from a rabbit inoculated with *B. dysentericus* Tor No. 1. The serum was then saturated with *B.* Tor, centrifugalized, and decanted.

B. Serum Tor + *B. pseudo* D = same serum, except that it had been saturated with *B. pseudo* D.

C. Serum *pseudo* D. + *B. pseudo* D = serum from a rabbit inoculated with *B. pseudo-dysentericus* D. The serum was then saturated with *B. pseudo-dysentericus* D, centrifugalized, and decanted.

D. Serum *pseudo* D + *B.* Tor = the same serum as above (C), except that it had been saturated with *B. dysentericus* Tor No. 1.

B. pseudo-dysentericus A. According to the agglutination tests, therefore, the bacilli can be divided into three main groups: Group A, composed of *B. dysentericus* El Tor No. 1 and *B. pseudo-dysentericus* D; Group B, comprising Flexner's bacillus and *B. pseudo-dysentericus* A;* and Group III, containing *B. dysentericus* (Shiga-Kruse).

Saturation Test.

It has been repeatedly pointed out that the agglutination test, though valuable for the differentiation of micro-organisms, is by no means final, as the injection into an animal of a given micro-organism may produce substances agglutinating not only the injected micro-organisms but others also. Kruse has pointed out the great value of the saturation test in the differentiation of dysenteric bacilli. This test consists in adding to a serum a quantity of the micro-organisms with which the serum has been prepared. If this serum be now decanted and tested it is found that *all* the agglutinins have disappeared. If, on the other hand, this serum be tested with a serum which, though agglutinated by this serum has not been used for the injection, the serum no longer agglutinates this microbe, though it still agglutinates the microbe with which it has been prepared. The injection of Bacillus A, for instance, produces a serum agglutinating Bacillus A and Bacillus B. If this serum be now saturated with Bacillus A and decanted, it agglutinates neither Bacillus A nor Bacillus B. Contrariwise, if this serum be first saturated with Bacillus B, it no longer agglutinates Bacillus B but still agglutinates Bacillus A. In other words, a given micro organism added to its own homologous serum neutralizes all the agglutinins, but when added to a heterologous serum, it neutralizes the agglutinins specific for itself, but not the other agglutinins.

Table III gives the results of this test.

The table shows that the Serum Tor when saturated with *B.* Tor loses the agglutinins for *B. dysentericus* Tor No. 1 and for *B. pseudo-dysentericus* D. On the contrary, when the same serum is saturated with *B. pseudo* D, it loses the agglutinins for *B. pseudo-dysentericus* D, but not for *B. dysentericus* Tor No. 1. Similarly, the serum pseudo D, when saturated with *B. pseudo* D, loses the agglutinins for *B. pseudo-dysentericus* D and *B dysentericus* El Tor No. 1, and when saturated with *B. dysentericus* El Tor No. 1 it loses the agglutinins for *B. dysentericus* El Tor, but not altogether those for *B. pseudo-dysentericus* D. The *Bacillus dysentericus* El Tor No. 1, therefore, when injected into rabbits produces agglutinins for B. Tor No. 1 and for *B. pseudo-dysentericus* D. Both agglutinins are neutralized by *B. dysentericus* Tor No. 1, but not by *B. pseudo-dysentericus* D. Similarly *B. pseudo-dysentericus* D, when injected into rabbits, produces agglutinins acting on *B. pseudo-dysentericus* D and on *B. dysentericus* Tor No. 1, but here both agglutinins are removed by the addition of *B. pseudo-dysentericus* D to the serum, whereas the addition of *B. dysentericus* Tor No. 1 leaves the agglutinins for *B. pseudo-dysentericus* D untouched. As the injection of *B. pseudo-dysentericus* D and *B. dysentericus* Tor No. 1 produces serums differing specifically in their agglutinating properties, we must conclude that they are not identical.

Nevertheless, it is quite clear that the two micro-organisms are very closely related, and this is shown by the agglutinating actions common to their specific serums, by their identical action on sugars, by their common morphological characteristics, as well as by the results of cross-immunization. They are far more closely related to one another than either of them to the *B. dysentericus* (Shiga-Kruse) or to *B. dysentericus* (Flexner), or than either of the latter to one another. We have given to this bacillus the name of *B. dysentericus* Tor No. 1, but we wish it to be distinctly understood that the name is a provisional one. It may be that it will prove identical with some of the bacilli discovered by Shiga in Japan and Kruse in Germany, and which we have had no opportunity of studying.

Fixation Tests (complement Ablenkung.)

Our friend Dr. Crendiropoulo, who has had great experience of this method of investigation, was good enough to study these various serums by this method. We need not here go into the details of his experiments, as the net result obtained was that he was unable to obtain convincing differentiating reactions by this method.

REMARKS.

As has been stated already in the beginning of this paper, there are, during the Mussulman pilgrimage, at least seven different causative agents of dysentery, the most important one being the one we have just described under the name of *B. dysentericus* Tor No. 1. This multiplicity of causative agents renders the treatment of dysentery extremely difficult, for, whereas it is comparatively easy to recognize, by examination of the stools, the cases which are due to amoebae, it is impossible to diagnose in this way, or by the physical signs, to what class of dysenteric bacilli the other cases are due. And yet this diagnosis is most important, for we have found that whereas the serum prepared by injection of the Shiga-Kruse bacillus has a most remarkable curative action on the cases in which the disease is clearly due to this bacillus; the severe cases caused by the *B. dysentericus* Tor No. 1 are not at all affected by this serum. On the other hand, the few severe cases

* It may be that further experiments would have shown a difference between Flexner's bacillus and *B. pseudo-dysentericus* A.

which we have treated with the serum of a horse, repeatedly injected by *B. dysentericus* Tor No. 1, were not only benefited, but quickly cured. Unfortunately, it is not practicable to establish the bacteriological diagnosis before using the serum. The minimum period necessary for such a diagnosis is thirty-six hours, and this valuable time must not be lost, as most of these patients arrive in an almost hopeless condition. The treatment, therefore, must be commenced at once, and our only hope is to prepare a polyvalent serum, as Shiga has already done in Japan. Thanks to a grant from the Egyptian Government, we hope to have such serums ready for the next pilgrimage season.

ON THE VALUE OF COLOURED SUBSTRATA FOR THE DETECTION AND DIFFERENTIATION OF THE TYPHO-COLI GROUP.

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IN view of the great epidemiological importance of "carrier" cases of typhoid, and of the etiological relationship of non-lactose-fermenting bacilli of the Gaertner group to paratyphoid fever and meat poisoning, any method which will admit of the speedy identification of such organisms in the contents of the bowel must form a welcome addition to bacteriological technique. There are at least two ways of accomplishing the desired object—namely, by substrata which shall either (1) cause the colonies that are being sought for (typhoid, paratyphoid, dysentery) to assume a distinctive appearance, or (2) suppress the ordinary *coli* germs, so as to enable the relatively few non-lactose fermenters to appear prominently on the plate. In dealing with paratyphoid bacilli and Gaertner infection, the non-lactose fermenters often occur in such numbers that the stool is practically a pure cultivation of them and no special method is necessary.

Having had occasion lately to investigate three extensive outbreaks of typhoid which were undoubtedly due to carrier cases, I have been making comparative series of cultures from such cases containing a minority of typhoid bacilli, in the presence of a large excess of *coli*. Moreover, at Limerick I had occasion to study on a large scale the effects of intense Gaertner infection, and, last year, I studied two cases of paratyphoid bacillus infection, and isolated the bacillus. With these materials in hand, it occurred to me that it might be of interest to give the Section the results of my comparative study of the behaviour of these organisms, and also the Flexner and Shiga strains of dysentery, on the following media:

1. The original Drigalski (litmus, lactose, nutrose agar, with crystal violet).
2. Endo's fuchsin-agar, without and with addition of caffein to inhibit *coli* (Gaehtgens's modification).
3. The new brilliant-green picric acid medium of Conradi.
4. The modification of No. 3 introduced by Captain Fawcus in the *Journal of the Royal Army Medical Corps* for February, 1909 (addition of lactose and bile-salt, and less acid reaction).
5. Werbitzki's China-green agar—namely, an ordinary 3 per cent. bouillon agar, neutralized to *plus* 13 (Eyre), and to each 100 c.cm. of which is added from 1.4 to 1.5 c.cm. of a 0.2 per cent. solution of China-green (I procured my sample from Grübler).

It would have been most interesting had I been able to include in this series Dr. McConkey's useful bile-salt-neutral-red-lactose-agar, and one or other of Loeffler's malachite-green substrata. But I have to leave them out of account on this occasion.

(After demonstrating cultures of the stool of a typhoid case, containing a moderate number of typhoid bacilli, and also by way of contrast those of a healthy suckling a month old, and containing only *coli* of *aerogenes* type, together with yeasts, the speaker proceeded as follows:) These plates are all surface inoculations, made with a Drigalski spatula. Great care was taken to use a similar amount of the suspected material for the primary plate of each medium, and the faeces were carefully homogenized, so that the results may, I think, be fairly compared. Each plate has been incubated twenty-four hours, but they have now been for four days standing at rather high room temperature, which has rather spoiled the appearance of the Endo by causing the red colour of the *coli* to diffuse. Of all these substrata, that which yielded the best results in my hands is the China-green. On it about 75 per cent. of the *coli* are suppressed, and the surviving colonies are much inhibited, being small, opaque, and point-like. The typhoid has developed most luxuriantly, and its colonies are more numerous than on any of the other media. They present a very characteristic appearance, being thin, of a delicate transparent green tinge, which is deeper in the centre. The colonies, after two days, present a thinner filmy peripheral layer, spreading like a veil, and beautifully sulcate under a low power. A drawback is the fact that bacilli taken from these colonies are mostly non-motile, and unsuitable for agglutination work. A subculture in broth is needed to restore their typical characters.

Next in value to China-green comes, in my opinion, the Conradi medium. *Coli* is largely inhibited, and assumes an opaque yellowish-green hue, whilst the typhoid colonies are more transparent, colourless, thinner, and flatter. Their motility and agglutinability are well preserved. Still, the distinction is sometimes a delicate matter, and several colonies have often to be tested before arriving at a genuine typhoid organism.

With regard to Captain Fawcus's modification of this medium, my experience being limited to a single batch of substratum, I do not feel justified in expressing any very definite opinion. It seems to me to inhibit not only *coli* but also typhoid to some extent, for, after twenty-four hours' incubation the typhoid colonies were fewer and smaller than on the corresponding plate of Conradi. Afterwards, however, they came along well at room temperature, and now present an appearance very like that on China-green, and more distinctive than that on Conradi. They were, however, distinctly less numerous. As for the *coli*, most of the colonies were surrounded with a cloudy zone, due to the effect of the acid on the bile salt. I am not, however, convinced that any great advantage is gained thereby.

It is hardly necessary for me to describe the appearances on the original Drigalski and Endo plates, as these media are in everyday use wherever this sort of work is being done. A glance, however, serves to show that the better distinction is yielded by the Endo, and that in both cases the overwhelming majority of the colonies are those of *coli*, thus presenting a striking contrast with the China-green agar, on which the large majority are those of typhoid. It is interesting also to note that the Endo permits the development from the suckling stools of numerous colonies of yeast, which are suppressed on all the other substrata. I have failed to get good results from the addition of caffein.

With the object of giving an uncomplicated picture of the mode of growth, I now show (demonstration) a series of pure surface cultures of the several organisms on each substratum. The following are the cultures shown: Typhoid, *coli*, paratyphoid B and A, a virulent strain of Gaertner isolated from the outbreak of meat-poisoning at Limerick, Ratin, and the dysentery bacilli of Shiga and Flexner. It will be at once evident that the growth of *coli* is almost completely inhibited on Conradi, Fawcus, and China-green, and, what is interesting, the two strains of dysentery are also unable to develop on these substrata. None of the media shows any distinction between Gaertner and Ratin.

Encouraged by the good results obtained with China-green on plates, I have tried it for enriching milk in typhoid bacilli. This would constitute a great improvement in our present means of analysing that fluid bacteriologically. But I have not yet succeeded in obtaining satisfactory results.

ON HETEROLOGOUS AGGLUTININS,

MORE PARTICULARLY THOSE PRESENT IN THE BLOOD SERUM OF CEREBRO-SPINAL FEVER AND TYPHUS FEVER CASES.

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[ABSTRACT.]

IN a previous paper[1] Professor Symmers and myself have called attention to the presence of agglutinins for the typhoid bacillus, the colon bacillus, and a bacillus of the *alcaligenes* class in the blood serum of patients suffering from cerebro-spinal fever from whose lumbar puncture

fluid, and in some cases from whose blood, the *Micrococcus intracellularis meningitidis* (Weichselbaum) had been cultivated. Further observations have confirmed and extended our previous results.

Agglutination of the B. typhosus.

Seven out of 21 samples of the serum of cerebro-spinal fever patients "clumped" the *B. typhosus* in a 1 in 50 dilution, and of these 7, 3 still gave a positive reaction with a 1 in 200, and 1 with a 1 in 400 dilution.

Agglutination of the B. coli communis.

A typical colon bacillus isolated from the faeces of a cerebro-spinal fever case was used as the test organism, and 18 samples of blood serum were examined. In 16 of them the results were negative, and in 2 positive, with a 1 in 50 dilution of the serum, and one of these cases still gave a positive reaction with a 1 in 400 dilution.

Agglutination of a Bacillus of the Alcaligenes Class.

This bacillus is actively motile, and in its morphology and cultural characters resembles the *B. faecalis alcaligenes*. It was isolated from Belfast tap-water, and, for convenience of description, has been named *Bacillus aquatilis alcaligenes*. We have examined as to its agglutinative action altogether 184 different samples of the serum of cerebro-spinal fever cases, and have found that 90 per cent. of the cases agglutinated the *B. aquatilis alcaligenes* in a dilution of 1 in 50. In most of the cases agglutination was still present with a 1 in 100 and much higher dilutions. In 16 cases the blood serum gave marked "clumping" within an hour to dilutions of 1 in 1,000; and, further, we found that one of the 16 agglutinated in 1 in 1,400, 2 in 1 in 1,500, 4 in 1 in 1,600, 4 in 1 in 2,000 dilutions respectively.

It is possible to remove the agglutinins from the serum by saturation with the *B. aquatilis alcaligenes*, whilst saturation with the meningococcus, *B. typhosus*, *B. coli communis*, or *B. faecalis alcaligenes* (Král) leaves them unaltered.

These results were controlled by the examination of the blood serum of healthy adults and of patients suffering from various infectious and general diseases. In round numbers, of 168 controls 22 per cent. gave a positive result with a 1 in 50 dilution of the serum. In none of them was agglutination present in higher dilutions than 1 in 100; on an average a dilution of 1 in 35 of normal serum caused slight clumping.

Agglutination of the Meningococcus.

Fifty specimens of serum taken from cases of cerebro-spinal fever were examined. All gave a positive reaction with a 1 in 10, 38 with a 1 in 20, 20 with a 1 in 50, and 6 with a 1 in 100 dilution.

I have followed the course of development of the agglutinins for the meningococcus and for the *B. aquatilis alcaligenes* in the blood serum of a case of cerebro-spinal fever, and have found that when the results obtained in each instance are represented by curves there is a certain degree of parallelism between the latter. To this, however, there are many exceptions.

The blood serum of a horse which had been immunized against the meningococcus was much richer than normal horse serum in agglutinins, not only for the meningococcus but also for the *B. aquatilis alcaligenes*. It would seem that in certain individuals and animals infection with the meningococcus leads not only to the production of specific agglutinins which act on the infecting micro-organism, but also to others which act on various other bacteria. A consideration of the literature on agglutination shows that in immunization specific agglutinins are produced, and also group agglutinins (Pfaundler) which act on nearly related micro-organisms and mitagglutinins (Wassermann) which act on organisms which stand further away in a botanical classification. In certain cases the secondary agglutinins are not removed from the serum when it is saturated with the infecting micro-organism, in this respect differing from the group agglutinins and the mitagglutinins. To such secondary agglutinins the name "heterologous nebenagglutinins" (Sagasser) has been given; and their existence proves that Castellani's specific absorption method cannot be relied upon to distinguish secondary agglutinins from those which are really specific and are due to a mixed infection.

Observations of a similar nature to those recorded by Professor Symmers and myself have been made by Posselt and Sagasser,[2] Hetsch and Lentz,[3] Ballner and Sagasser,[4] and Park and Collins.[5]

Effect of Heat on the Agglutinins in Cerebro-spinal Fever Cases.

Heating the serum to 60° C. for ten minutes destroys the agglutinins for the meningococcus, but only partially destroys those for the *B. aquatilis alcaligenes*. Heating to 65° C. for ten minutes completely destroys the agglutinins both for the meningococcus and for the *B. aquatilis alcaligenes*. With what component of the serum are the heterologous agglutinins bound? By means of precipitation with various strengths of ammonium sulphate solution it was found that these agglutinins were associated with the globulin component of the serum, and that the greater part belonged to the "pseudo-globulin," a smaller part to the "euglobulin" fraction.

Agglutinative Action of Typhus Blood Serum on Typho-coli Organisms.

Thirty-one different samples of the blood serum taken from Belfast cases of typhus fever were examined as to their action on the *B. typhosus*, with the result that 18 gave a positive and 13 a negative reaction with a 1 in 50 dilution of the serum. On several occasions different strains of typhoid bacilli were employed, and almost invariably specimens of blood from non-typhus cases were simultaneously examined with reference to the Widal test, and so served as controls for our results. In 2 cases there was still a trace of agglutination with a 1 in 200 dilution. In a few of the cases there was a history of a previous attack of typhoid fever, but in the majority there was no such history, and in one of the cases (a young girl), in which the serum reacted in a dilution of 1 in 200, minute inquiry failed to elicit any account of a preceding illness.

Seven cases of typhus fever were examined as to the action of their serum on a variant strain of the *B. coli communis* which had been isolated from the faeces of one of the cases. On an average the agglutinative action was five times greater than that of normal serum.

The presence of these secondary agglutinins indicates that caution must be exercised before a conclusion can be arrived at that a certain micro-organism is actually infecting an individual, even though it is found in his alimentary canal and there are specifically absorbable agglutinins for it in his blood serum.

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PORTALS OF ENTRY OF TUBERCLE BACILLI INTO THE BODY.

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THE object of the experiments here described was to find out (1) whether bacteria can gain entrance to the lungs directly through the air passages, and (2) whether, after being absorbed from some part of the alimentary canal, they can pass at once through the lymphatic glands and gain entrance to the lungs. The general intention of the experiments was to throw light on the question of the portals of entry of the tubercle bacilli into the human body in the causation of phthisis.

The experiments are divisible into three groups—namely, those made (1) with particles of carbon, (2) with *B. prodigiosus*, and (3) with *B. tuberculosis*. The animals used were guinea-pigs, except in a few instances, in which rabbits and mice were employed.

The results may be briefly summarized as follows:

1. *Experiments with Particles of Carbon (25 Experiments).*

(*a*) Young guinea-pigs fed with Indian ink,* or lamp-black, on one or more occasions showed no pigmentation of mesenteric or cervical lymphatic glands, and no pigmenta-

* Winsor and Newton's liquid Indian ink was generally used, made from genuine "stick ink." In a few cases Chinese stick was employed

tion of lungs or bronchial glands, except in two experiments (feeding with dry lampblack mixed with the food both dry and moist, for eleven and fourteen days respectively), when the conditions were such as did not exclude the possibility of the pigment being inhaled directly into the lungs.

(*b*) Feeding adult guinea-pigs in a similar manner resulted in no pigmentation of the mesenteric or cervical glands, nor of the lungs or bronchial glands; such pigmentation as was found in these latter situations in some of the guinea-pigs fed with carbon being equalled in normal animals of corresponding age which served as controls. Some degree of pigmentation of lungs and bronchial glands in normal guinea-pigs of 500 grams and over is common in Cambridge.

The results of these experiments are directly opposed to the belief that pigmentation of the lungs is of intestinal origin, and suggest the possibility that spontaneous pigmentation may sometimes have been mistaken for the result of an experimental feeding with carbon.

2. *Experiments with B. prodigiosus: (a) Inhalation (26 Experiments); (b) Feeding (14 Experiments).*

(*a*) Cultures were made from a large number of organs and glands of animals exposed to a spray containing the bacillus. In all the more recent experiments the spray used was of the finest description, and was continued only for one or a few minutes. It scarcely sufficed to produce any perceptible wetting of the coats of the animals.*

B. prodigiosus was cultivated from the extreme marginal portions of the lung of all these animals, unless the interval between spraying and death exceeded fifteen hours. In two instances the animals ceased to breathe within three and five minutes respectively of the commencement of the exposure to the spray.

The bacillus did not fail to reach the lungs after the oesophagus had been ligatured in two places and divided. The bacillus reached the bronchial glands in ten hours, if not earlier, but was not found in them after the fifteenth hour. It was twice found in the mesenteric glands and once in the cervical. It was invariably absent from other parts of the body, except in the case of one of the earlier animals, which was entirely exceptional.

(*b*) Feeding with *B. prodigiosus* (14 experiments).

Guinea-pigs were made to swallow large quantities of *B. prodigiosus*, killed after intervals of three to fourteen hours, and cultures made from their organs and glands. In the case of about half the guinea-pigs, one or two colonies—often a single colony only—appeared in one or more of the four tubes sown copiously with lung emulsion. It is, however, by no means certain that these reached the lungs after being absorbed from some part of the alimentary canal, for it is probable that the bacilli do not survive long enough in the stomach and intestines to do so; for only rarely could a colony of *B. prodigiosus* be cultivated from their contents; and in not one of these experiments did *B. prodigiosus* appear in the cultures from the mesenteric glands. Once, however, a single colony appeared in a tube sown from the gland just below the symphysis of the lower jaw (submental). Observing the frequency with which guinea-pigs make a choking noise when feeding, and especially when fed artificially, I have no difficulty in believing that the bacilli in question may have reached the lungs directly—that is, by the air passages. Intertracheal injections of small quantities of these bacilli were followed by their appearance in the margins of the lungs.

3. *Experiments with B. tuberculosis: Inhalation Experiments (14), Feeding Experiments (13).*

Both feeding and inhalation experiments were undertaken. The former are by no means yet complete. The results were, on the whole, similar to those obtained after feeding with *B. prodigiosus*. Their interpretation awaits further experiments. When guinea-pigs were fed with tubercle bacilli and allowed to live some weeks, tuberculosis appeared first in the mesenteric or cervical lymph glands, and no disease appeared in the lungs until it became generalized elsewhere.

The spraying experiments clearly show that tubercle bacilli suspended in the air can readily penetrate deeply into the lungs. When the animals exposed to the spray were killed a few minutes or hours after, and their emulsified organs injected into other guinea-pigs, tuberculosis was invariably produced by the lung emulsions. A much less severe tuberculosis was in some cases produced by the bronchial or mesenteric glands. When guinea-pigs exposed to the spray of tubercle bacilli were allowed to live from one week to a month, and then killed and examined, tubercle bacilli were found in large numbers in the lungs before any lesions appeared anywhere. Elsewhere they were absent, except in small numbers in the bronchial and cervical lymph glands. Tuberculous lesions first appeared in the lungs, then in the bronchial glands, after which they were found in the portal lymph gland and the spleen. The mesenteric glands invariably escaped tuberculosis, but in 1 case (out of 10) three tubercle bacilli were seen fourteen days after exposure to the spray.

*A "Myra" spraying bottle was used for the recent experiments.

Conclusions.

The experiments as a whole are not yet completed. They, however, clearly show already that in the guinea-pig, bacilli suspended in the air readily pass down the bronchi deeply into the lungs. The experiments are not sufficiently advanced to justify any conclusions as to the course of infection which follows the introduction of tubercle bacilli into the alimentary canal.

ON THE PROTOZOAN ORIGIN OF TUMOURS.

BY

W. Ford Robertson, M.D. and M. C. W. Young, M.B., Ch.B.

For several years, and in numerous papers and demonstrations, we have advocated the view that certain forms of malignant tumour are associated with the presence of protozoan organisms which determine the morbid proliferation of the cells. Our contentions have been based chiefly upon the alleged demonstration of the parasites in the tissues by new methods, upon their cultivation, and upon the experimental production of carcinoma in mice by feeding with incubated carcinomatous fluid from the human subject. As is well known, the opinion that malignant tumours are of parasitic origin has long been held. At one time, indeed, it was the most favoured view of their etiology. In recent years, however, it has come to have very few supporters. The reason for this is certainly not that the parasitic hypothesis has been proved to be erroneous. It lies, we think, chiefly in two facts—namely, that about fifteen years ago opinion almost completely revolted against the current parasitic theories, which seemed incapable of being definitely proved, whilst at the same time they conflicted with each other, and that shortly thereafter totally different methods of investigation came into fashion, which seemed to offer sure hopes of the complete elucidation of the problem of cancer. How these hopes have been falsified is a matter of history for those who can read it. The enormous activity that has been shown in orthodox cancer research during the past ten years has unquestionably resulted in the elucidation of many important facts regarding the pathology of tumours, but it has left the essential question of their etiology as obscure and mysterious as it was fifty years ago. We think it could hardly have been otherwise, for, with all respect to the many able workers who have pursued this special line of investigation, and with ungrudging appreciation of their magnificent labours, we venture to maintain that they have missed the right path in this *selva oscura* of cancer research, and the sooner the fact is realized the better will it be for the interests of medical science and of a vast contingent of suffering humanity.

We wish at this meeting to present the case for the protozoan origin of tumours as it stands on the ground of the evidence we have obtained, and to demonstrate this evidence, as far as possible, by means of microscopical preparations and lantern slides presently to be shown on the screen. We cannot, in the time at our disposal, attempt to compare our observations with those already recorded by other workers. Our methods are quite different from those that have been used by others, and we believe that many of the forms we describe have not previously been identified at all. For these reasons our observations are capable of standing by themselves.

We maintain that just as there is a very extensive group of pathogenic micro-organisms, classed as schizomycetes, which determine various forms of inflammation, so also there is another extensive group of pathogenic micro-organisms, probably to be classed as mycetozoa, which determine the development of various forms of tumour. We assert that in many tumours we can demonstrate bodies that are obviously protozoa, and that there are other microscopic forms which, though not by themselves capable of being proved to be of the same nature, can yet be traced from or to these definite forms and given a place in a life cycle which has close affinities with that of known protozoan cycles.

We are well aware of the dangers that there are of being misled by degenerative products, and even by normal appearances, but these do not exclude the occurrence of protozoa any more than the caseous material in a tuberculous lung excludes the occurrence of bacilli. We have now used our special methods for so many years, and are so familiar with what they reveal, not only in tumours but in other morbid conditions and in normal tissues, that we can speak with confidence regarding the special bodies to which we attach importance. By means of the palladium methyl-violet method we undertake to distinguish, as a rule, only the rod form or sporozoite.

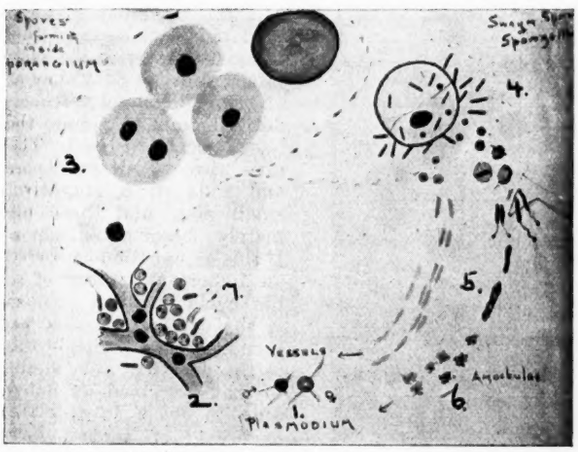

Fig. 1.—Provisional cycle of a mycetozoon. 1, Gametes lying free in plasmodium. 2, Nuclei of zygotes in vessels. 3, Zygotes in sporangium, where they divide and form resting spores. 4, Sporocyst rupturing and setting free sporozoites. 5, Dark sporozoites become amoebulae; pale sporozoites form vessel walls. 6, Amoebulae form a plasmodium, in which there develop gametocytes and asexual sporoblasts. 7, Asexual sporoblasts give rise to swarm spores and sporozoites.

By means of the ammonio-silver process and cyanide decolorization we reveal the cyanide-fast bodies, which extend in the life cycle from the plasmodium to the swarm spore. Degenerative granules that resist decolorization are often present in various morbid tissues, and the mere fact that a body is cyanide-fast we do not regard as proof of its protozoan nature. We rely upon the occurrence of certain additional and characteristic features, which we shall describe.

In order that we may be able to make quite clear our contentions with regard to the occurrence of protozoa in tumours, we must recall the life cycle of the *Haemamoeba malariae*, a sporozoon, and compare it with that of *Badhamia utricularis*, a saprophytic mycetozoon, and with that of *Plasmodiophora brassicae*, which is by some classed among the mycetozoa, but by others included in a lower group, the proteomyxa. The last named is parasitic in the cells of turnips, cabbages, and other plants, and determines the development of tumour-like growths.

In the case of the *Haemamoeba malariae*, the crescents or gametocytes, upon gaining access to the body of the mosquito, ripen to form the fully-developed male and female gametes. By a process of exflagellation from the male gametocyte, there is formed a microgamete, which unites with a macrogamete. The body resulting from this conjugation is the zygote or travelling vermicule. This, in course of time, becomes the sporoblast, within which there develop numerous rounded bodies which subsequently give rise to the spindle-shaped sporozoites. The sporocyst ruptures and the sporozoites escape. On being transferred to the human body, these enter the red corpuscles and become amoebulae, thus initiating the asexual cycle. Within the red corpuscles the amoebulae proliferate and form an aggregation termed a sporocyte, the individuals composing which separate and escape from the corpuscle as little nucleated bodies termed "merozoites." These enter other red corpuscles and become amoebulae, and thus the asexual cycle starts again. Alternatively, the merozoite may develop into a crescent, thus initiating the sexual cycle already described. According to Schaudinn, a female gamete that has not become fertilized may undergo successive divisions, and give rise to amoebulae.

The life cycle of *Badhamia utricularis*, though differing widely from the preceding, has certain close analogies to it (Fig. 1). There are gametocytes and fully-developed gametes. The method of conjugation does not appear to have been determined definitely, but it is probably direct, as in *Plasmodiophora*, without the preliminary formation of a microgamete. Conjugation is followed by a resting phase. When further development takes place, there is liberated from within a capsule a large rounded body with two long, thin flagella. It becomes a sporoblast. This discharges from its interior a large number of small rounded forms, which increase in size and give off rodlike bodies, or sporozoites, each of which has a flagellum at

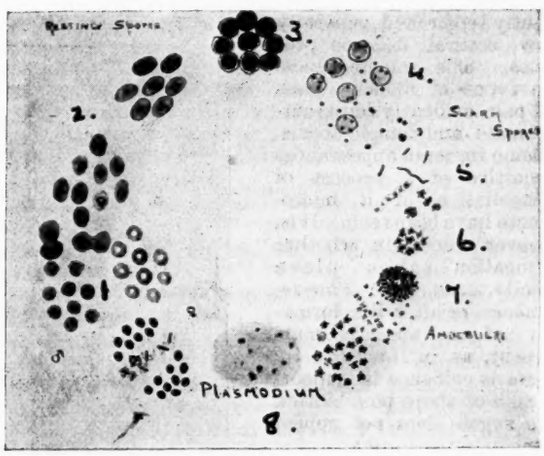

Fig. 2.—Cycle of *Plasmodiophora brassicae*. 1, Gametes. 2, Zygotes. 3, Resting spores. 4, Formation of swarm spores. 5, Sporozoites or rods. 6, Amoebulae. 7, Sporocytes and second generation of amoebulae. 8, Plasmodium.

one end. These sporozoites may complete their development before rupture of the sporocyst. They next break up into rounded nucleated bodies which represent an amoebula phase. It is very doubtful if there is any true plasmodium, though the term is commonly applied to the creeping film, which, however, is composed of independent sporozoites, amoebulae, and gametocytes in various proportions, according to the age of the growth. The walls of the vessels that form an essential part of these films are apparently formed by deposition of successive layers of a pale type of sporozoite which is always present. The development of a sporangium marks the ripening of the gametes, the occurrence of conjugation, and the formation of resting spores. The important point in this life cycle for our present purpose is the occurrence of a rod or sporozoite phase. These rod forms appear always to have been mistaken for bacilli. We have made observations which we think place it beyond doubt that they are a phase in the life cycle of this protozoon. There is also evidence of the occurrence of an asexual cycle comparable to that described by Schaudinn in one of the malarial parasites.

The life cycle of *Plasmodiophora brassicae*, to which we have devoted much study, differs considerably from that of each of the foregoing, but again the analogies are close and striking (Fig. 2). Although regarded by some as a mycetozoon, this protozoon does not, on account of its parasitic habit, form a sporangium. The gametes, as seen in the cytoplasm of the turnip cell, are rounded or oval bodies with a well-defined nucleus but without processes. There are male and female types, distinguished by their comparatively dark and pale nuclei. Conjugation takes place by direct fusion of two individuals. There is

no preliminary formation of a microgamete. Immediately after conjugation a capsulated spore develops, and this constitutes a resting phase as in *Badhamia*. When activity is resumed swarm spores develop within the original capsule, and, after having been liberated, develop into a rod form or sporozoite. It is probably by the sporozoite that the young turnip is infected. There has also been described as issuing from the spore a large flagellated form, as in *Badhamia*. In the cells of the plant the sporozoites break up and form amoebulae. These multiply and coalesce into a plasmodium; from this the gametocytes arise and ripen into gametes. The cells infected by these last three forms are stimulated to intense proliferative activity.

The life cycle of the protozoa that we describe in tumours has much in common with each of these three types that we have described, but it has also its special features (Fig. 3). Its asexual cycles very closely resemble those of *Haemamoeba malariae*, whilst in other respects its general characters most closely approximate to those of *Plasmodiophora brassicae*. There seem to be numerous pathogenic species, distinguishable by morphological and other characters. The gametocytes are represented by nucleated bodies without processes; they measure from 0.5 to 2 μ in diameter, and in ammonio-silver preparations are cyanide-fast. They develop into gametes which are slightly larger and generally show several delicate processes. The gametes have two types of nucleus, dark and pale, evidently representing male and female forms. In some tumours appearances suggestive of a process of exflagellation of a microgamete have been seen. It is, however, uncertain whether conjugation takes place directly, as in *Plasmodiophora*, or after the formation of a special male element, as in *Haemamoeba*. There is evidence in support of each of these possibilities. The zygote does not appear immediately to form a resting phase, but becomes a motile form, like the travelling vermicule of the *Haemamoeba*. This is at first an elongated body with two flagella at each end. After a time it seems to lose or to retract its flagella, and as it moves about in the tissue spaces, the anterior part is drawn out into a thin process with bulbous extremity. The zygote subsequently develops into a rounded sporoblast, a body measuring from 3 to 6 μ in diameter, and extremely cyanide-fast. This sporoblast may proliferate before going on to the next phase. As it matures, there issue from its interior minute swarm spores, each of which is furnished with an extremely delicate short flagellum with a knob at the end. These swarm spores increase considerably in size and then shed off one or more minute rods, the sporozoites. At one end of these there is a delicate flagellum with a terminal enlargement. These rods have little affinity for aniline dyes, and cannot be distinguished in sections stained by the ordinary methods for the demonstration of bacteria in sections. They are generally revealed by the palladium methyl violet method. These sporozoites display a remarkable chemiotactic attraction for the nucleus of a tumour cell. One can often be seen abutting upon the nuclear membrane, indenting it, or even penetrating it. Within a nucleus or elsewhere the sporozoite breaks up into minute amoebulae. These are nucleated bodies of irregular outline. The largest forms measure about 2 μ in diameter, but most of them are very much smaller. They are only slightly cyanide-fast, but can sometimes be seen in great numbers in ammonio-silver preparations toned with gold and only very slightly decolorized. They may also be seen in palladium methyl violet preparations. Within the nucleus or protoplasm of the tumour cell they tend to proliferate in such a way as to form compact groups. They then virtually constitute a sporocyte similar to that which develops within the red blood corpuscle in the case of *Plasmodium malariae*. Under certain conditions the amoebulae develop into much larger and more intimately associated aggregations which constitute plasmodia. In ammonio-silver preparations with cyanide decolorization these are comparatively large granular masses which occur within a nucleus, in a dividing tumour cell, in the cytoplasm of a resting cell, or in the tissue spaces. The gametocytes take origin in these plasmodia. This cycle does not, however, include all the forms that can be identified. A place requires also to be given to certain delicate, faintly staining bodies, from 2 to 5 μ in diameter, which occur in and around malignant tumours, and which often appear in large numbers in the cultures to which we shall afterwards refer. They have a characteristic ping-pong ball indentation, and contain a minute basophile particle. As seen in the tissues, their limiting membrane and chromatic particle are cyanide-fast. We have known of these bodies for some years, but for long had the greatest difficulty in understanding their significance. For a time it seemed that they might be altered red corpuscles or remnants of other cells. We have, however, been able to eliminate such possibilities and to trace these structures with considerable certainty. The explanation that appears to us to consist best with the ascertained facts is that they are an asexual form of sporoblast derived from a gamete that has not been fertilized. They give rise to swarm spores and rods of comparatively small size, and these ultimately become amoebulae. If this explanation is correct, an important feature of the life cycle of these protozoa is the occurrence of a parthenogenetic multiplication of the parasites, very similar to that described by Schaudinn to occur in the *Haemamoeba* of tertian fever. In some tumours the sexual phases seem to be, for the time, entirely in abeyance, whilst this and the other asexual phases are abundant.

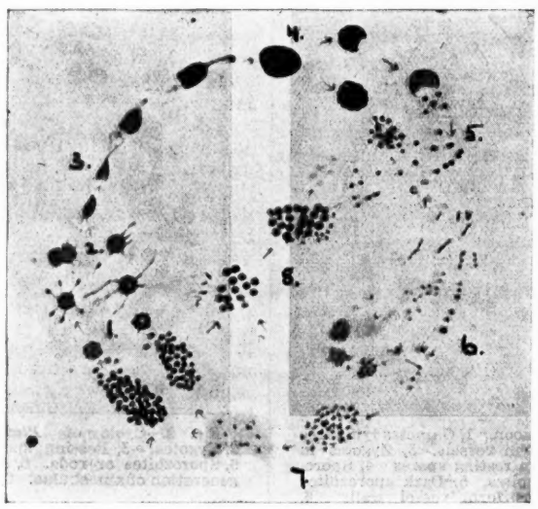

Fig. 3.—Cycle of protozoa described in tumours. 1, Gametocytes. 2, Conjugation (preliminary development of microgamete ?). 3, Zygote. Travelling vermicule. 4, Resting spore. 5, Development of swarm spores and sporozoites. 6, Amoebulae. Short asexual cycle. 7, Plasmodium. 8, Long asexual cycle.

Evidence from the Study of Sections of Tumours.

The ammonio-silver process yields the best results only with sublimate fixed tissues, from which the mercurial deposit has been completely removed by the prolonged action of iodine in alcohol. We have not always had at our command suitably fixed tissues, and, occasionally, the method has failed to yield successful preparations. Nevertheless, we have now an extensive series of tumours in which the necessary conditions for the obtaining of successful preparations have been fulfilled, and it is chiefly to some of these that we wish now briefly to refer.

With Jensen's adeno-carcinoma of the mouse we at first obtained only partially successful results. Last autumn Dr. Madsen, of Copenhagen, after a visit to Edinburgh, during which he was shown some of our preparations, kindly obtained for us from Professor Jensen two pieces of this kind of tumour. With one, which was sublimate fixed, we have obtained what we regard as successful ammonio-silver preparations. In these nearly all the phases of the protozoa that we have described can be seen. The most conspicuous features are the gametes with delicate processes extending from their cytoplasm. This phase is present in very large numbers, twelve or more often being visible in a single field under an oil immersion lens. These bodies occur chiefly within the protoplasm of the tumour cells, and are very commonly to be observed in cells that are dividing (Fig. 4). Another specially prominent form is the plasmodium, which is also generally

intracellular, and indeed frequently intranuclear (Fig. 7). The asexual phases are also represented. It is probable that shortly before this tumour was obtained its nutritional conditions had been such as to initiate the sexual cycle, which had evidently not proceeded much beyond the maturation of the gametes.

In all of the seven tumours induced experimentally in

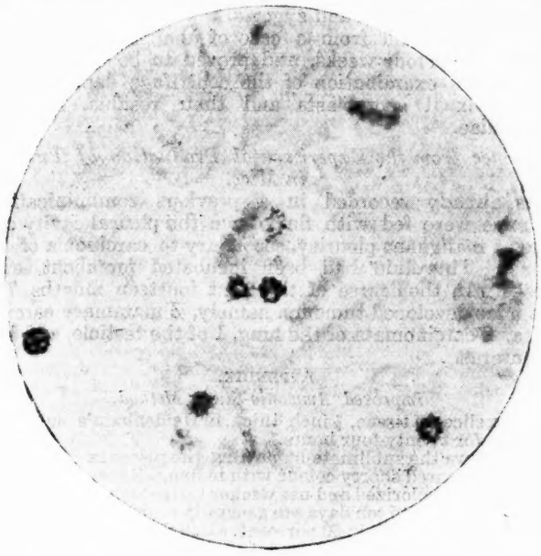

Fig. 4.—Gametes in dividing epithelial cell: Jensen mouse tumour. Ammonio-silver cyanide process. Carbol thionin. (× 1,500.)

mice, to which further reference will be made, we have been able to demonstrate several of the phases we have described. The gametes are smaller and less richly branched than in the Jensen tumour, but they are morphologically identical with the corresponding phases in scirrhous cancer of the human breast, from a case of which was derived the fluid with which the animals were infected. In the neighbourhood of a carcinoma of the lung, included in this series of tumours, there is a remarkable development of sporozoites within cells that have

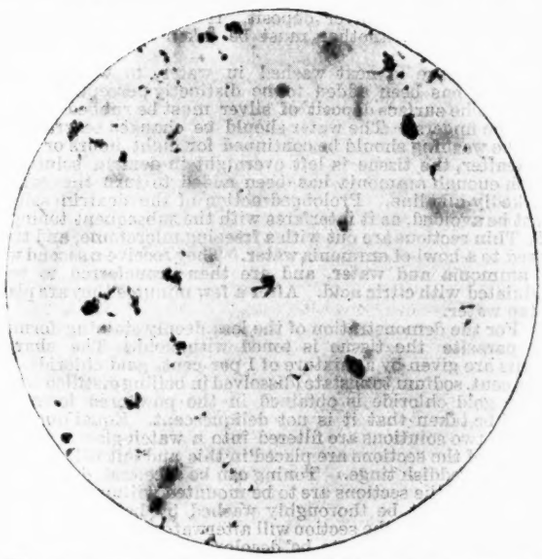

Fig. 5.—Gametes. Possible exflagellation of microgametes. Squamous epithelioma. Ammonio-silver cyanide process. (× 800.)

shown no proliferative response. They fill the protoplasm of the cells, and give rise to an appearance almost identical with that to be observed in the corresponding phase of the *Haemamoeba* immediately before the rupture of the sporocyst.

In a squamous epithelioma of the lip, the ammonio-silver process has revealed large numbers of gametes, as in the Jensen tumour. They have, however, certain distinctive morphological features which compel us to believe that they are of a different species. They are generally smaller, and have longer processes. In this tumour, zygotes with and without visible flagella are also abundant (Fig. 5). Another very remarkable feature in this tumour is the occurrence of active phagocytosis of the parasites by polymorphonuclear leucocytes, which can be seen to be taking up the cyanide-fast bodies, not only in the tissue

Fig. 6.—Sporoblast giving off swarm spores. Sarcoma of breast. Ammonio-silver cyanide process. (× 800.)

spaces, but quite commonly within the protoplasm of the epithelial cells.

A case of scirrhous cancer of the breast has yielded preparations which show every phase that we have described. The gametes are exactly like those in the experimental mouse tumours. Asexual sporoblasts, and the forms that are derived from them, are numerous. In palladium methyl violet preparations, small rods occur in very large numbers, several often being visible within the protoplasm of a single epithelial cell.

Fig. 7.—Plasmodium in dividing epithelial cell: Jensen mouse tumour. Ammonio-silver cyanide process. Carbol thionin. (× 800.)

In a case of encephaloid cancer of the breast, the alleged parasitic bodies are also present in large numbers, but the species would appear to be different from that in the scirrhous cancer to which reference has just been made. The most remarkable feature is the occurrence of great numbers of swarm spores (whether of the sexual or of the asexual part of the cycle it is impossible to say) and sporozoites in the cytoplasm and nucleus of the epithelial cells. In palladium methyl violet preparations, some of

the cells contain as many as twenty or thirty sporozoites. In this tumour these rod forms are not infrequently jointed. They can quite commonly be observed in process of entering a nucleus, and of breaking up to form nucleated amoebulae.

Another scirrhous cancer of the breast (not sublimate fixed) shows in the epithelial cells very numerous delicate and often jointed rods. Asexual sporoblasts and swarm cells are also numerous.

A rapidly-growing squamous epithelioma (not sublimate fixed) shows, in preparations by the palladium methyl violet method, very many intracellular rods, which can occasionally be seen to have a flagellum. These sporozoites can be clearly traced from a rounded body, and can be observed in many instances to be developing into amoebulae.

A sarcoma of the chest wall has given a remarkable result, to which allusion may be made. Not in preparations by the palladium methyl violet method, which is carried out upon formalin or sublimate fixed tissues, but in sections made from a silvered block, subsequently decolorized by potassium cyanide, and then stained by the palladium methyl violet process, there are revealed in the protoplasm of the tumour cells very numerous ragged amoebulae, generally forming groups. Some gametes with distinct processes are to be seen in ammonio-silver preparations.

In formalin-hardened lymphatic glands from three cases of lymphadenoma, which on being received were passed through a sublimate solution, the ammonio-silver method with gold toning and partial decolorization with cyanide has revealed large numbers of amoebulae. Some of these bodies appear to be in process of mitotic division. One diaster figure is so distinct that its genuineness is hardly open to question. In one of the cases the preparations show a sporocyte phase in the nuclei of many of the tumour cells.

The infective sarcoma of the dog appears to fall within the same etiological group, for it shows similar bodies. Their morphological characteristics are, however, somewhat special, and the species would therefore appear to be quite distinct. Plasmodia, gametes, sporozoites, and amoebulae have been observed. The sporozoites are unusual in respect of being fairly cyanide-fast.

Evidence from the Study of Cultures and Incubated Tumour Fluids.

We have endeavoured to ascertain if the bodies that our methods reveal in sections of tumours can be seen in cultures and in fluid from cases of malignant pleurisy and malignant peritonitis, especially after incubation for various periods.

Dr. Henry Wade and one of us have already described certain bodies which developed in large numbers in an agar medium, subjacent to pieces of a secondary growth from a case of carcinoma of the intestine after seventeen days' incubation. We have restudied these bodies in the light of our more recent observations, and can recognize the forms that are so abundant as swarm spores, the largest of which can be seen to be giving off rods. Many gametes and some travelling vermicules are also present.

A similar culture from a tumour (mammary carcinoma) which developed in the abdominal wall of a mouse, after feeding with incubated fluid from a case of malignant pleurisy, contains every phase excepting the rods. A remarkable circumstance in the case of this culture has been the development of an aggregation of sporoblasts at a considerable distance below the surface. After fourteen days' incubation some of this agar culture was injected in emulsion into the abdominal wall of a number of mice. One of these mice, which died forty days later, shows in sections of the abdominal wall at the site of the injection an islet of agar, and in this there are several sporoblasts, some of which are giving off swarm spores. There are also large numbers of swarm spores collected in groups.

From a carcinoma of the oesophagus which had extended to the skin of the neck, cultures were made in sheep's serum diluted with normal salt solution. The cultures remained bacteria-free. After various periods of incubation the fluid was centrifugalized, and the deposit was examined microscopically. It showed numerous bodies having the characters of the asexual sporoblasts, swarm spores, and sporozoites.

Similar cultures made from pieces of tumour from three cases of scirrhous cancer of the breast have shown the same three forms on examination after from eleven to fifteen days' incubation.

Cultures of the same kind from a sarcoma of the breast, examined after four weeks, have shown capsulated bodies closely resembling the resting spores of *Badhamia utricularis*, and also asexual sporoblasts, swarm spores, rods, amoebulae, gametes, and zygotes.

Peritoneal fluid from a case of malignant peritonitis, incubated for four weeks, and proved to be bacteria-free, showed, on examination of the centrifuge deposit, abundant asexual sporoblasts and their residua, and also amoebulae.

Evidence from the Experimental Production of Tumours in Mice.

As already recorded in a previous communication,[1] 30 mice were fed with fluid from the pleural cavity of a case of malignant pleurisy, secondary to carcinoma of the breast. This fluid had been incubated for about seven weeks. In the course of the next fourteen months 7 of the mice developed tumours, namely, 3 mammary carcinomata, 2 carcinomata of the lung, 1 of the testicle, and 1 of the uterus.

APPENDIX.

Improved Ammonio-Silver Method.

1. Fix slices of tissue, ¼ inch thick, in Heidenhain's sublimate solution for twenty-four hours.

2. Remove the sublimate by putting the pieces in 80 per cent. alcohol, coloured sherry colour with iodine. Renew this fluid as it becomes decolorized and use weaker iodine solutions towards the end. Seven to ten days are generally required.

3. Wash out iodine in 80 per cent. alcohol and keep pieces in 80 per cent. alcohol till required.

4. Before silvering, wash out the alcohol in water and place the piece of tissue in 5 per cent. formalin in distilled water for twenty-four hours.

5. Wash out formalin in several changes of water for three and a half hours or longer. Rinse piece well a short time before putting into the silver solution.

6. The silver solution is made by adding to a 5 per cent. solution of silver nitrate in distilled water 5 per cent. ammonia in distilled water, till the precipitate first formed re-dissolves, and then adding silver nitrate solution till the cloud formed has become quite dense. (The bottle to be used must not have contained formalin.) Five c.cm. of this solution are ample for a piece of tissue the size of a shilling. Too large a quantity tends to make the tissue friable when cut. The bottle containing the solution and tissue is corked and incubated at 37° C. for seven days. If the fluid has been rightly made up, it should after a few hours' incubation be clear, or have a slight violet tinge, and show a black silver deposit. If the sides of the bottle become silvered, another must be taken and fresh solution prepared.

7. The tissue is next washed in water, to which enough ammonia has been added to be distinctly perceptible to the smell. The surface deposit of silver must be rubbed off gently with the fingers. The water should be changed several times, and the washing should be continued for eight hours or longer. Thereafter, the tissue is left overnight in dextrin solution, to which enough ammonia has been added to turn the reaction markedly alkaline. Prolonged action of the dextrin solution must be avoided, as it interferes with the subsequent toning.

8. Thin sections are cut with a freezing microtome, and transferred to a bowl of ammonia water. They receive a second wash in ammonia and water, and are then transferred to water acidulated with citric acid. After a few minutes they are placed in tap water.

9. For the demonstration of the less deeply staining forms of the parasite the tissue is toned with gold. The sharpest results are given by a mixture of 1 per cent. gold chloride with 1 per cent. sodium tungstate (dissolved in boiling distilled water). If the gold chloride is obtained in the powdered form, care should be taken that it is not deliquescent. Equal quantities of these two solutions are filtered into a watch-glass. A dozen or more of the sections are placed in this and left till they show a distinct reddish tinge. Toning can be accelerated by slightly warming. If the sections are to be mounted without decolorization, they must be thoroughly washed by being left several hours in water, or the section will afterwards darken very much.

10. If the sections are to be decolorized they are transferred after toning, one at a time on a glass rod, to a 2 per cent. solution of potassium cyanide in a watch-glass. Here they remain until they have become of a bright pink tint; or, if required, till they have almost completely lost their colour. They must then be rinsed in two changes of water. If it is desired to counterstain them they should be dipped for one or two seconds in Neisser's methylene blue, and then washed in water. The sections, whether simply toned or decolorized, are next dehydrated with alcohol, cleared with turpentine-benzol on a heater, and mounted in benzol-balsam. If the section and balsam are absolutely anhydrous, the counterstain should last several years.

11. An easy and safe way of decolorizing certain phases of parasite which have silvered too deeply with the seven days'

incubation is as follows: Place the sections in a 1 per cent. solution of platinum bichloride till they assume a pale chocolate tint, then rinse them in water and decolorize in cyanide as before. The sections should almost immediately turn a cream colour. Next wash them well in water and counter-stain for one or two seconds in carbol thionin. If the silver does not come out at once, it is better to return the sections to the platinum solution than to push the cyanide.

12. Several sections should always be examined to determine the degree of decolorization required in each instance, and the methods modified according to the particular feature it is desired to bring out.

13. By leaving silvered or gold-toned sections in 1 per cent. formalin in distilled water a slightly greater sharpness of definition in the parasites is obtained, and a greater resistance to decolorization. Silvered sections for the platinum method may be left in the formalin solution indefinitely; but gold-toned sections should not be left, as a rule, for more than two or three days.

By carefully following the above method it should be possible with a little practice to obtain absolutely clean preparations in which the parasites stand out in red, black, or brown of various shades against the blue of the tumour cells. The ammonio-silver solution is essentially a true stain. After cyanide decolorization the colourless tissues contain silver in some organic combination which mordants them for aniline dyes. The same mordanting effect can sometimes be obtained on the parasites if the cyanide decolorization is pushed far enough, their demonstration not being essentially dependent, as in other silver methods, on reduction of the silver salts to a metallic state.

Film Method.

Centrifugalize the culture fluid, and drain the deposit as thoroughly as possible. Make a thin film of the deposit with a platinum loop on a clean cover-glass. As soon as the film is dry (it must not be heated), hold the cover-glass with forceps in normal salt solution for ten to fifteen seconds. Then rinse it gently in a bowl of water. The film must then be fixed. For this purpose 10 per cent. formalin in absolute alcohol, 5 per cent. formalin in normal salt solution, or 80 per cent. alcohol may be used (one to five minutes). If it is not convenient to proceed at once with the staining, the cover-glasses, after having been washed in water, should be dried and kept from dust. Methyl violet, 5 B or 6 B, in 1 per cent. solution in water, is the most serviceable stain. If allowed to act for five to ten minutes it will show sporoblasts, swarm spores, and sporozoites; but films must be stained many hours to reveal gametes and other phases of the cycle. After staining the film must be thoroughly washed in water, dried, and mounted in balsam, which must be anhydrous.

A finer result is sometimes obtained by placing films which have been previously stained overnight with methyl violet in Gram's iodine for ten minutes or longer, washing in water, drying thoroughly, and then decolorizing with equal parts of aniline oil and benzol. Every precaution must be taken to prevent precipitation of moisture on the film.

If films are kept longer than a few hours before washing in salt solution it is not possible to get a clear background for the parasites.

For a description of the palladium methyl violet method for showing the "rod" phase, see the *Lancet*, January 25th, 1908.

REFERENCE.
[1] *Lancet*, June 5th, 1909.

EFFECT ON THE GROWTH OF MICRO-ORGANISMS OF DIFFERENT PERCENTAGES OF OXYGEN.

BY

BENJAMIN MOORE, M.A., D.Sc., Johnston Professor of Bio-Chemistry, University of Liverpool.

and R. STENHOUSE WILLIAMS, M.B., D.P.H., Lecturer on Public Health Bacteriology, University of Liverpool.

THIS paper was a summary of one already published in full in the *Bio-Chemical Journal*, vol. v, Nos. 3 and 4. The authors investigated 37 organisms in all as to their rate of growth in atmospheres containing varying percentages of oxygen. Of these, only 3 species were completely inhibited in their growth—namely, *B. tuberculosis*, *B. pestis*, and *Staphylococcus pyogenes aureus*—whilst the remaining 34 species were not affected in their growth as compared with control experiments under ordinary atmospheric conditions. The lantern slides of cultures demonstrated are reproduced in the paper mentioned above.

The paper was discussed by Dr. LAZARUS-BARLOW, who regarded as a strange coincidence the fact that the organisms found by Professor Moore and Dr. Williams to be inhibited by oxygen were the same as the organisms that alone of many affected a skotographic plate—that is, which exhibited radio-activity. He had not experimented with *B. pestis*, but otherwise used 28 different varieties.

SECTION OF OPHTHALMOLOGY.

J. WALTON BROWNE, B.A., M.D., President.

PRESIDENT'S INTRODUCTORY REMARKS.

DR. WALTON BROWNE, after a few words of welcome to the members of the Section, said:

It is but right that in a meeting of the Ophthalmic Section of the British Medical Association I should refer to the loss the speciality of ophthalmology has sustained in the death of Simeon Snell, the late President of the Association, a position never before achieved by any ophthalmic surgeon. I knew Mr. Snell well, and often admired his great energy and power of concentrating work. You are all familiar with his contributions to the literature of ophthalmology, how well he wrote upon the special type of nystagmus attacking miners, and the great experience he possessed of foreign bodies in the eye. Sir Anderson Critchett wrote of him: "We can ill spare from our ranks one who possessed such high qualities of loyalty, integrity, and intellectual capacity, and Simeon Snell will ever be held in most kindly remembrance by all who had the good fortune to enjoy his friendship." With this opinion I thoroughly concur.

It is now a quarter of a century since the Association met in Belfast. At the Ophthalmic Section on that occasion my friend, the late Dr. W. A. McKeown of Belfast, in his presidential address, gave to the ophthalmic world the intracapsular or intralenticular method of dealing with immature cataracts. He considered his method shortened operations for cataract. It put aside scoops, spoons, curettes, and did away with manipulations through the eyelid to remove cortex. I well remember how he was criticized, but I think any one who has used the method must admit that it has been a valuable addition to the technique of cataract operations. McKeown was the first man in Britain, if not in the world, to introduce a magnet into the interior of the eyeball for the extraction of particles of steel. He was a man of wonderful energy. Through his exertions the Royal University, of which he was a Senator, was the first examining body in Great Britain to insist upon a special examination in ophthalmology for the degree of M.B. I, as a brother Senator, was able to assist him by my vote and counsel. You are now in the city of the birth of the intracapsular method, and demonstrations can be arranged if so desired.

I regret that on the present occasion your President has no new methods, either operative or otherwise, to bring before you. Many inventors and authors are in the field. In my time I have read of many innovations in ophthalmic surgery and medicine, but regret to say I have not found some of them possessing the advantages claimed by the writers.

I daresay it has occurred to some of you to ask why a man occupying the position of a surgeon to a general hospital should be in the presidential chair of this Section. When I commenced work, now some years ago, and when practising general surgery and ophthalmology, I found myself in good company. In former days it was the custom for the ophthalmic surgeon to be largely interested in general surgery. I remember when I was a student at Moorfields in 1869, being taught by Sir Jonathan Hutchinson, Mr. Critchett, Mr. Hulke, and Mr. Dixon, all of whom were general surgeons. Then, later, Mr. Couper, Mr. Lawson, and Mr. Waren Tay also practised general surgery. It is well known to you that Bowman was at one time a general surgeon. Now matters are changed, and—at least in London—all the leading ophthalmologists are pure specialists. At the same time, I think the so-called specialist would be greatly benefited by a prolonged drilling in medicine and surgery before blossoming out as an ophthalmic surgeon.

In many large centres, but principally in the provinces, the ophthalmic surgeon takes up otology in addition. I daresay you are aware that the founder of Moorfields practised in both eye and ear diseases, and possibly his example prompted other men to follow suit. Later on the ophthalmic surgeon tacked on to his practice diseases of the nose and throat, and now it is quite common to find a number of men engaged in the quartette of eye, ear, nose, and throat.

Whether the ophthalmic surgeon should take up diseases of the ear, nose, and throat is a vexed question. It is urged that there is little connexion between the ear and eye, and that it is impossible for one man to master the enormous literature applying to any one of these organs. Although I admit there is not much connexion between the eye and ear, I consider the nose and eye are closely related and have much in common. The closeness of the relationship has been fully demonstrated during the past few years in affections such as obstruction of the lacrymal duct, retro-bulbar neuritis, and inflammatory processes in the orbit and conjunctiva; hence, I believe that all ophthalmic surgeons, especially in provincial towns, where a competent rhinologist is not at hand, should be able to use a nasal speculum, probe, and head reflector. All my colleagues in Belfast combine the four diseases in their practice.

As regards our speciality in Ireland, the first special hospital for the treatment of diseases of the eye and ear was the Dublin National Eye and Ear Infirmary, established in 1814 by Surgeon Ryall. In 1844 the late Sir William Wild founded St. Mark's Ophthalmic Hospital in Dublin, and in the same year my late father, Dr. Samuel Browne, established the Belfast Ophthalmic Hospital. At the present day we have in addition in Belfast the Ulster Eye and Ear Hospital and special departments at the Royal Victoria Hospital, the Mater Infirmorum Hospital, and at the two children's hospitals.

Sir William Wild wrote a treatise upon diseases of the ear, and his published papers upon eye affections are to be found scattered throughout the old *Dublin Quarterly Journal*.

He was a man of much originality, and described several operations, which were brought forward in later years by other men as original work.

My late father also did a lot of original work, but did not write much. He slit the canaliculus, and used probes to the lacrymal duct very early in his career. He strongly advocated short-handled ophthalmic instruments, which have during the past year been recommended by some Continental surgeons.

I only mention these few facts to show you that this little "distressful country" was well to the front years ago in many points appertaining to ophthalmic work. Our science is progressive, and no doubt many advances have been made during the past few years in treatment, but especially in pathology. In advocating new remedies we are apt to forget the work done in days long past, which are now designated old-fashioned, but I should not like to see swept away some of the old remedies. May I refer to the seton in the temple for some forms of keratitis; the application of liniment of iodine to the temple to relieve the intolerance of light in strumous or tuberculous conjunctivitis; saline aperients in many forms of iritis; the artificial leech; small doses of tartar emetic in many inflammatory conditions of the cornea and conjunctiva; sulphate of copper in trachoma; in the treatment of ophthalmia neonatorum procuring a healthy wet nurse, and many other old-fashioned remedies to which I could refer?

DISCUSSION ON EYE INJURIES IN RELATION TO WORKMEN'S COMPENSATION.

OPENING PAPER.

By FREELAND FERGUS,
Surgeon, Glasgow Eye Infirmary.

THE problem of compensation for eye injuries is all but insoluble; at any rate, there are not at present sufficient data to give a solution, for statistics, so far as I am aware, have not been collected in sufficient quantity. Attempts have been made, both in this country and abroad, to derive mathematical formulae expressive of what may be called visual efficiency. The two communications on this subject which are of most easy access are, first, the very suggestive and able paper by Mr. Berry, of Edinburgh, in vol. xxv of the *Transactions of the Ophthalmological Society of the United Kingdom;* secondly, the excellent paper by Mr. Percival, of Newcastle-on-Tyne, read at the recent International Ophthalmic Congress. It will at once be admitted by all ophthalmic surgeons who are competent to form a just opinion that in the department of mathematics as applied to the practice of ophthalmology no higher authorities exist. Whatever they say on such a matter must be received as authoritative. I do not propose in this short paper to criticize in any way these contributions; all the more so, that with the full knowledge of the subject which these gentlemen possess, each of them states that no formula can be absolute; it, at best, can only express an approximation, or perhaps only indicate the directions in which a solution is to be obtained.

An author who was also an authority, the late Professor Peter Guthrie Tait, is reported to have said that it was quite impossible to formulate anything which involves human volition. We might go a step further, and say it is impossible to reduce to mathematical formulae anything involving human action based on individual human volition and intelligence. Thus, to take an example which seems to me somewhat apropos, I know of one blind man who can scarcely find his way to the house next door, and I know of another who plays an excellent hand at whist, and who on certain occasions has been known to get out on the leads of his house to shovel off the snow. Here it may be remarked parenthetically that because one blind man is able to perform such feats it would be extremely wrong to, say in a court of law or otherwise, act on the supposition that all blind persons are similarly capable.

But, to take a less extreme case, suppose a number of persons who have naturally or on correction of all errors of refraction only $\frac{6}{60}$ of Snellen's scale, and all sound in body and limb, are they all equally efficient as regards vision? Of course they are not, for, in addition to the visual acuteness, there comes in *inter alia* the all-important factor of intelligence. Both Mr. Berry and Mr. Percival at once admit the limitations of their results, and that the question of visual efficiency is, after all, almost individualistic.

As already stated, in the department of mathematical investigations as applied to ophthalmology, I hold that there are no higher authorities than Mr. Berry and Mr. Percival, and I welcome their important communications. It is, therefore, with some degree of diffidence that I have formed the opinion that each of them has left out elements which seem to me of the greatest importance. Each of the authors mentioned has a good deal to say, and very properly, as to efficiency in terms of the acuteness of vision. Rightly or wrongly, I have come to the conclusion that all forms of work may roughly be divided into two great groups. In the first, visual acuteness is of primary importance. To this class belong such occupations as those of a watchmaker, an author, a lawyer, a medical practitioner, and very many others. For the most of these, also, it is absolutely necessary that there be a good binocular sense. In another large class of employment visual acuteness in the strict sense of the term plays only a secondary part. For these occupations the efficiency largely depends on the light sense (minimum and difference) and on the sense of alignment. This group includes almost all those where the work is of a manual or labouring nature.

Here also the important consideration arises as to whether for a particular form of work a man requires, in addition to a good light sense and correct alignment, binocular vision. For a few kinds of employment he may, but for most he does not.

While not in the least depreciating the careful and original work which has been done by the gentlemen mentioned—on the contrary, while acknowledging its extreme importance—it has always seemed to me that the inquiry should go more on the lines of actuarial investigation. There should be the collection of voluminous statistics from which average results for different classes of occupations might in time be derived. Thus, Mr. Berry, in the communication referred to, says:

> In any case, some statistics giving satisfactory evidence as to the extent of the limitations produced in different occupations by visual defects must be got to start with. But it is obvious that it would not be practical to ascertain the extent of limitation produced by all degrees of defect of vision.

Statistics would have to be obtained for each trade separately. Some years ago I investigated the efficiency for

work of a number of men each possessed of only one eye, and communicated the results to the Toronto meeting of the British Medical Association. They showed that men with only one eye had been known by me to work at the following occupations, namely: dock labourer, iron turner, boilermaker, farrier, ship-caulker, engine-fitter, blacksmith. After investigation I have come to the conclusion that there is scarcely any work below ground which a man cannot undertake who has only one eye.

Thus, I have known men with one eye working as holers, brushers, underground managers, and, indeed, carrying on all sorts and conditions of work. In the paper just referred to two cases are recorded in which the vision of the remaining eye was only $\frac{1}{10}$ of Snellen's scale, and in which the workmen had been able to continue their work for years below ground. Such instances seem to me to bear out my contention that there are many forms of work for which visual acuteness in the proper acceptation of the term is not much required. The important functions of vision here are probably alignment and the light sense. Nor is this so surprising when we come to investigate what I have called the field of visual acuteness; it is found to occupy only a very small area round the point of fixation. For these reasons I am not content with the solutions that have been given, for to me the evidence is quite conclusive that a man who has got an ordinary light sense and who has also good alignment can perform almost any kind of manual work. It therefore seems to me that any attempt to express visual efficiency in terms of visual acuteness alone may lead to serious error.

A few remarks must be made as to the necessity of binocular vision or otherwise for this second group of cases.

To begin with, I have known instances where men possessed of only one eye have been known to drive stobs; where they have worked as riveters, as ship-caulkers, and as farriers. So long as the problem is one of alignment, and absolute as distinguished from relative distance, the thing seems quite simple.

An interesting experiment which I have often made on myself and on others is conducted as follows: A point on a flat surface is selected as the fixation point, and a small object, such as a sixpence, is placed in different positions on the same surface. While the person looks steadily at the fixation point he finds no difficulty, while holding one eye shut, in striking the small object with a hammer or other suitable weapon. The test object may be placed practically at any point of the field of vision. Thus I have placed it in such a position that the visual axis made, with a line joining the centre of the test object and the first nodal point of the eye, an angle of fifty or sixty degrees. In such an instance the important factors are obviously the alignment and the actual distance of the object to be struck. Here there is no question of the relative distances of various objects. This experiment alone goes a long way to prove the truth of the view that for many forms of manual work visual acuteness is not much required; for when an object is placed at a considerable distance from the point of fixation, its image is formed at a part of the retina where the visual acuteness is extremely small.

There are factors other than convergence that help the individual in the estimation of distance. Accommodation is certainly one of these factors, and probably the size of the retinal image is another. If a person has for many years relied on that ready estimation of distance which is a function of convergence, then it may take a considerable time before he can estimate actual distances perfectly correctly. Any one, however, who cares to make the simple experiment above indicated will find that he experiences no difficulty in striking the object. Mr. Berry thinks that a man who has been in the habit of working with binocular vision and who is suddenly called upon to work with monocular must at first be under considerable disadvantage, and with that remark we are in accord. Still it must be said that for most manual occupations a man who has only one eye and who has in it fair vision, good alignment, and good light sense, is little inferior in earning capacity to the man with two.

So far it is plain sailing; a man with one useful eye, as defined above, is, after he has recovered from his injuries, for the most part competent for his former employment. There are, however, certain subsidiary questions which are not so easily settled. Two in particular seem to demand some special notice. First, suppose a man's occupation is one of the very few which demand binocular vision, there arises the question as to his having to change his employment for something quite different.

Secondly, there is in all cases in which a man is capable of returning to his original occupation his diminished chances of getting employment on account of the presence of the defect.

As already stated, the manual occupations which a man with only one eye cannot undertake are very few. But suppose that for any given employment it is proved that binocular vision is required, then compensation must be liberal, and the amount should increase with the age of the person. Only very exceptionally after 35 or 40 years of age can a man learn a new trade or profession. The want of adaptability to new conditions is very great in middle life. Philanthropists and others, horrified by the conditions of slum life, often raise the cry of "back to the land," but it is the children or young adults who must go to the land. They alone can be given the training which is necessary to make them successful in the highly technical and somewhat precarious work of agriculture. Adults, with a few exceptions, could not be trained to make such employment remunerative. So it is with other forms of occupation. A middle-aged man or woman may be said in general terms to be incapable of learning a new trade, and in fixing compensation where the lack of binocular fixation destroys a man's power of working at his former employment, compensation should be for permanent disablement.

From this point of view it would be well to have an official list enumerating all the trades at which monocular men in the past have been known to work. That, to a considerable extent, would be of service to judges in giving their decisions. If it can be proved beyond reasonable doubt that men with only one eye have in the past been known to pursue a certain calling successfully, then there is no reason why they should not do so in the future.

In the second place, should compensation be given or continued indefinitely because a man with such a defect may experience a difficulty in getting employment? Many learned judges have held that this is too remote. Their opinion seems to be that if a man has recovered from his injuries, and it is proven that he is fit for his work, there the matter ends, and that he is not entitled to compensation for future contingencies which are only problematic. At the same time, it cannot be denied that, as matters stand at present, a man so situated may experience great difficulty in getting work. Such a person is what may suitably be called an under-average risk, and an employer, either of his own accord or acting under the instructions of the company with which he is assured, may refuse to employ such a man. This brings me, naturally, to the consideration of what I have called under-average risks and the effect of legislation in producing unemployment.

Since the passing of the Act elderly people, persons with any physical defect, or whose employment would involve any undue risk, have been thrown out of work in large numbers. No one can live in an industrial community without meeting this phase of things at almost every turn. It is a mere matter of time till insurance companies will insist on all persons insured by them being sound both in body and limb. Already the Act has compelled many men who are perfectly able to earn their own living, and who are more than willing to do it, to enter the ranks of the unemployed. When the insurance companies become more particular, as they certainly will before very long, then probably as many as one-third of the entire workers in the United Kingdom will be thrown out of work.

Take but one example out of many. Suppose a man has an aneurysm of the aorta. At any moment he may succumb to his malady. If at the time of the fatal termination he happens to be doing something in his usual occupation, then his death is almost certain to be attributed to strain, and damages claimed. Before long insurance companies will insist on the medical examination of all employees, and then the wretchedness and destitution which we regret to think are so characteristic of British city life will be multiplied enormously.

Now, for under-average risks, such as are involved in serious defect of sight, there ought to be the possibility of a contracting-out clause in the agreement between employer and employed. If an individual is certified by some competent and neutral authority, such as a factory surgeon, as being definitely under average, then there should be special treatment. The intention of the Act is a good one; it aims at the prevention of destitution during the incapacity of the bread-winner, but we fear that it has caused infinitely more destitution than it has prevented. Already it has thrown many industrious people out of employment, and the tale of woe has but commenced. The difficulty of any contracting-out agreement would be so to arrange matters that any lawful contracting out would not be taken advantage of to defeat the ends of the Act, which, in the main, we regard as good. The devising of some proper scheme, however, ought not to pass the wit of man. The subject is vast and the time allowed to any one speaker is by the rules of the Association limited. I am glad, therefore, to think that the subsequent speakers in this discussion are likely to supply much of what is lacking in these cursory remarks. On two other points only I would like to say a few words if I have not by now unduly trespassed on your indulgence.

And first I would point out that many employees have the idea that the Act is a sort of accident insurance. As my friend Dr. Marshall of Rothesay said to me the other day, a workman who gets any injury, no matter how trifling, is often apt to regard it as entitling him to a certain amount of money, and the problem that often occurs to him is as to how he is to make the most out of it. An insurance company knows that the expenses of fighting are considerable, and thus often settles for a larger sum than the injured person is strictly entitled to receive.

Now that was never the intention of the Act. It did not aim at accident insurance. All it sought to accomplish was compensation for incapacity, which seems to me a legitimate enough object. This erroneous view has given rise to considerable malingering, and even to a certain amount of neurasthenia. No wonder that insurance premiums have been increased. For one class of work with which I am acquainted the premium was at first 2s. per £100 of the wage bill; to-day it is 30s.

In conclusion, I wish to make some observations on medical refereeships. The idea underlying such appointments is excellent. If a workman knows that he is not going to face a judge and a jury who, however zealous they may be, have no technical knowledge, but an expert, he is not so likely to malinger.

If the medical referee is a man of first-rate professional standing, of high character, and, above all, of a judicial turn of mind who will look at a case in a perfectly unbiassed manner, then the plan of reference is an excellent one. At the same time, medical referees should be precluded from being, on the one hand, medical officers of workmen's friendly societies, and, on the other hand, of being the medical officers of insurance companies doing this class of business.

While the plan is good if the referees are suitable, it is disastrous if they are not.

One medical referee of whom we have heard has been connected with friendly societies during all his professional career and is the medical officer of one at the moment. This man also is extensively employed by one or two insurance companies for workmen's compensation cases and is very largely consulted by injured workmen. He has used his public clinic to a great extent for getting together a large court practice amongst injured workmen, and on one occasion is known to have suggested in a report that as a consequence of corneal ulceration a man had loss of patellar tendon-reflex.

We are glad to think that such a case is quite exceptional. Dodson and Fogg are not the rule but the exception in the profession of medicine, a remark which is equally true of the profession of law. All the same it would be much better that a medical referee should be forbidden by law to act for a workmen's friendly society or for an insurance company during workmen's compensation business. Further, to remove the case from all local bias, the referee for one particular district should reside in another. If, for example, two doctors in Manchester differ as to a case, the reference should be submitted to some one, say, in Liverpool or Leeds. Patients and documents can be so cheaply and easily transferred from one town to another that there can be no objection to this plan on the ground of expense.

Lastly, there are some, with whom I have great sympathy, who advocate that medical referees should be specially retained and paid a proper salary and allowed to do no other kind of practice. For such an area as Scotland, one physician, one surgeon, and one ophthalmic surgeon would probably suffice. The cases would either go to them or they could hold courts in different centres in conjunction with the county-court judges or sheriff's substitute.

DISCUSSION.

Dr. CECIL SHAW (Belfast) said: I desire specially to deal with the unsatisfactory working of the Workmen's Compensation Act with regard to compensation for the loss of an eye. According to the Act, no compensation is given for such loss, but only for partial or total incapacity for work. Where one eye is lost and the other is healthy a man soon learns to work with one eye, and in the great majority of cases work can be done quite as well as before. I know of four men in this district who are daily driving motor cars in spite of having lost an eye; and one of them, a professional chauffeur, told me that six months after the accident by which his eye was lost he had forgotten all about it. According to a strict interpretation of the Act, such cases should only obtain compensation for the few months that elapse before they are fit for work again. But the true injury in loss of an eye is not generally any loss of capacity for work, but lies in the greatly increased risk of total blindness owing to disease or accident in the other eye. Every one is liable to such disease and accident, but to the one-eyed man it is a much more serious event than to the man who has another eye to depend upon. Owing to this many employers avoid one-eyed men, since a slight accident to one eye may totally incapacitate them. Even though perfectly fit for work, they may fail to obtain it on this account. An interesting case occurred in my experience a short time ago, of which the facts were briefly as follows, I believe: A working girl lost an eye by accident, and after some months' incapacity, for which she received compensation, she returned to her work, which she was able to do efficiently. But when slackness of work arose and she had to seek work elsewhere she could not get a job, on account, as she believed, of her being one-eyed. She then brought an action for compensation; but it was pointed out that there was no ground to go upon, since there was no incapacity, as proved by her having worked at full wages for some months after the loss of the eye. I believe that a better form of compensation for the loss of an eye would be a sum fixed according to the average wages, to be paid irrespective of all theories or statements about a workman's capacity for work. The endless litigation involved in such cases benefits the great learned professions, no doubt; but it involves serious loss to the workman, for whose benefit the Act was passed, and out of whose pockets eventually the cost of the litigation comes.

Mr. BISHOP HARMAN (London) said that he was surprised at the comparative indifference exhibited by the opener of the discussion to the loss sustained by a man in the one point of deprivation of binocular or stereoscopic vision. It seemed to him that in many of the tasks mentioned, even such a one as bricklaying, the sense of the position of things was immeasurably better with the two-eyed man than with the one-eyed man. He would ask them to try an afternoon's round of golf with one eye obscured, and see how they were "off" their game; yet in that game alignment was perhaps of the greatest importance to skill. No doubt there were men who attained skill with but one eye, and he had known men successfully working for years as engineers and fitters with a single eye, but they did not represent the average; and one might ask how much better might they not have become had they retained both eyes. Next, there was the point of loss of nerve power—"pluck." It was, without doubt, of great importance in the modern workshop filled with rapidly-moving

machinery. If a man lost skill in a game because of a serious accident in that kind of game—and this he had reason to be sure of—how much more in a machine shop! Then there was no doubt that the one-eyed were seriously handicapped in getting work. He found that insurance policies for domestic servants excluded one-eyed persons from the current rates. And perhaps they would remember the evidence of a trial last year, which showed the lengths of deception to which a girl was brought who was persuaded by a rogue that he could make a new eye grow for the one she had lost! Hope to retrieve her lost position led her captive to his snare. There could be little doubt that they were right in urging employers to examine their workpeople—it was good for both parties. Disputes about the former states of injured organs would be eliminated, and work fitting to the capacities of the men would be apportioned. Lastly, he felt that a most pressing need was the removal of these cases from the grasp of the lawyer. The waste of money and time, and the bitterness following their operations were notorious. He would like to see the establishment of "Accident Courts"; to the presiding judge of every such district court reports of all accidents should be compulsory, at the time of the accident, together with the facts of the condition as ascertained by the doctors representing man and master; and that these, together with their final reports, should form the material on which the judge should award compensation in any case where he deemed it was due. Advice he might call in, but argument would be excluded, and the bane of litigation checked.

Mr. W. H. BRAILEY (Hove) said: The tendency of modern legislation is to make the employer liable for any injury taking place during employment, without any consideration of the fact that the employee may be partially or entirely responsible for the accident by his carelessness or by his physical condition having rendered him more liable to the accident. As an instance, I saw a case of high myopia (20 D) who was employed carting timber; he received a slight blow, and was rendered blind in one eye by detached retina. He received large compensation, to which I do not consider him entitled. From this it follows that a medical examination before employment must be instituted, which in time will be very strict. When this takes place, all those suffering from the loss of one eye or any other ocular disability will be excluded from employment. I do not agree that a man who has only one eye can be as employable as one who has two, for, however well he may do his work, he must be more liable to accidents, not only to the other eye, but to the body in general, for all of which the employer will be liable. It is, therefore, only wise and natural for the employer not to employ these people. As a remedy, I agree with Dr. Shaw, that the workman should be allowed, after competent medical examination, to contract out of the Act, if possible insuring himself, at a necessarily higher premium.

Dr. WALLACE HENRY (Leicester) suggested that a consultation between those consulted by workmen and insurance companies as to the facts and possible conclusions to be based thereon would frequently prevent unnecessary legal disputes and much discredit to the profession. He also supported Dr. Shaw's contention that the difficulty of obtaining work afterwards was nearly as important a factor in considering compensation as partial loss of vision.

Mr. JOHNSON TAYLOR (Norwich), referring to the occupations which Dr. Freeland Fergus said a one-eyed man could satisfactorily perform, asked if a middle-aged man, after the loss of an eye, could continue to work as a bricklayer, cabinet-maker, or billiard player (professional). Referring to Mr. Bishop Harman's references to the legal profession, he said it would be a very good thing if, in adjudicating on these cases, the sympathy of juries and county court judges, which was almost invariably in favour of the injured workman and opposed to the employer, could be got rid of.

Dr. ARTHUR GREENE (Norwich) was inclined to agree with Dr. Fergus in considering that the individual who had lost the sight of one eye was not (except for a few special occupations) at any great disadvantage from an earning point of view, provided the remaining eye had good vision. Many people (including the speaker) had little or no sense of perspective, and the loss such an individual suffered when he lost an eye was only a loss of size of his ordinary field of vision. He further was very strongly of opinion that any satisfactory legislation must have as one of its principal considerations the question of the possibility or not of the individual being able to "obtain work," and instanced a case where he had done a Mules's operation on a nurse girl. She got employment without difficulty, but as soon as her mistress found she had only vision in one eye she discharged her, although she had no fault with her work.

Mr. G. BERRY (Edinburgh) considered that a difference as regards compensation should be made in the first six months; also a difference in according damage to prospects which was of great importance in the young.

THE IPSOLATERALITY OF OPTIC NEURITIS AND THE LESION CAUSING IT.

By Sir VICTOR HORSLEY, F.R.S.,

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[ABSTRACT.]

SIR VICTOR HORSLEY said he intended to confine his remarks to that condition which De Schweinitz had aptly called "papilloedema," that is, a neuritis that depended solely upon intracranial pressure, and did not include any inflammatory manifestations. He knew Sir William Gowers objected to the idea of a pure mechanical pressure producing these symptoms, but for his own part he adhered to it. So long ago as 1890 he had demonstrated that these symptoms could be reduced by opening the skull and so relieving the intracranial pressure.

The special point he wished to maintain in regard to the special significance of the eye symptoms was that the neuritis was "ipsolateral," that is, on the same side as the brain lesion. In the past several extensive investigations had been made into the case records at Queen Square Hospital, London. In 700 cases tabulated by Middleton Martin 71 per cent. were ipsolateral. Williamson found 85 per cent. of ipsolateral cases in a large series of frontal tumours, the percentage being as high as 15.95.

Recently Paton had published the results of his tabulation of some 300 cases seen at the same hospital up to 1908, and his figures were distinctly smaller than those given. The speaker felt that in these returns too much stress had been laid upon the value of statistically aggregated records.

His view was emphasized by the fact that the cases tabulated included very many of his own cases, which he had seen both before and after their admission to hospital, and on which he had himself operated.

Taking a recent series of 18 cases in their own order, which were believed to be tumour cases, and in which the lesion was absolutely determined by operation with one exception—of these, all were ipsolateral save 3, and in these 3 one was indeterminate, or probably ipsolateral, and only one definitely contralateral. He then proceeded to detail some of the more striking cases, which showed and went against the rule of ipsolaterality.

On the particular points of diagnosis afforded by the appearance of the disc, he said that the earliest signs of oedema were seen in the upper part of the disc when the cause was purely mechanical pressure. Lantern slides of such cases were shown; also of photographs of the *post-mortem* conditions of the nerve.

Again, the field first showed contraction in its lower perimeter. As regards the formation of the macula star, he agreed with Mr. Gunn, who first pointed out that it was due to a radial rumpling of the retina about the fixed point of the macula; and this he had been able to show *post mortem* in a retina which during life did not show the star. Gunn had suggested that the white spots were in the outer granular layer of the retina, but he thought they were in the fibre layer. A number of sections were shown to elucidate this point. Lastly, the speaker dealt with the cellular deposit which formed these white spots. He found they were made up of two elements—connective tissue cells, which absorbed fat and stained well with osmic acid; and

large spheroidal cells, which had been formerly taken for swollen nerve fibres.

In conclusion, the speaker pointed out the necessity of laying stress on the observations of the general appearances of the neuritis rather than on a simple numerical measurement of the height of the swelling of the disc.

DISCUSSION.

Dr. GORDON HOLMES (London) said that, though his general impression, from the observation of a large number of cases of intracranial tumour, was that the optic neuritis was, as a rule, greater on the side of the tumour, Mr. Paton's paper, recently published in *Brain*, convinced him that where a difference between the two eyes existed it was greater almost as frequently on the side opposite to the tumour as on the same side. Mr. Paton's paper did not consist merely of clinical statistics; it was founded on the careful analysis of a large number of cases which were observed under conditions probably as favourable as possible. In confirmation of Paton's conclusions, it was interesting that Cushing and Bordley, who recently succeeded in producing papilloedema in dogs, found in some cases that the neuritis appeared first in the eye opposite to the experimental lesion. The question could be finally decided only by the careful analysis of large series of cases such as that on which Paton's paper was founded. Sir Victor Horsley's faith in the ipsolaterality of optic neuritis in intracranial tumours was so great that he had that day asserted that in the future the ophthalmologist might be of more service to the surgeon who operated in cerebral tumours than the neurologist; but it seemed very difficult to justify this assertion. Even if where there was a difference between the degree of the papilloedema in the two eyes it was constantly greater in the eye of the same side as the tumour, it must be admitted, in the first place, that such a difference was appreciable in less than half the cases which one saw, while in the other half the ophthalmogist could, at the most, only indicate the side of the brain in which the tumour lay, and this was manifestly insufficient for the surgeon who would undertake operative intervention for the cure of his patient. If, however, the doctrine that the optic neuritis was constantly greater on the side of the tumour be tenable, it might be valuable as an indication of the side of the skull a decompressive operation could be most favourably performed in cases in which the tumour could not be localized.

Mr. LESLIE PATON (London) said: Undoubtedly cases occur in which neuritis is greater on the side away from the tumour. A certain number of cases may be explained —for example, cases where there is direct pressure by the tumour on a nerve of one side preventing the development of neuritis in that eye, or cases in which, though the tumour is on one side, the main pressure effects are on the opposite side—but when one allows the exceptions, there still remain a large number of cases which are not to be explained away, a number too large to allow one to take it as a rule that the neuritis is greater in the eye of the side of the tumour In at least 50 per cent. of the cases the neuritis is equal in the two eyes.

Dr. JAMES HINSHELWOOD (Glasgow) said: Dr. Holmes has remarked what use can it be to the surgeon to know that the lesion is on a particular side of the brain? I will briefly relate a case which shows the great importance of this. I was called in to see a young lady who had been suffering from discharge from both ears with headache for some time, and for a few days before I saw her she had become semicomatose. On making ophthalmoscopic examination I found in the left eye mild optic neuritis, but in the right eye only a slight hyperaemia of the disc. The difficulty in the diagnosis was as to whether the patient was suffering from a general meningitis due to the discharging ears or a localized cerebral abscess, and, if an abscess, on which side of the brain. The occurrence of optic neuritis on the left side, in view of Sir Victor Horsley's teaching, was of great importance, as pointing to a localized lesion, probably abscess, in the left side of the brain. Curiously, immediately after the ophthalmoscopic examination the patient developed several excessive attacks of Jacksonian epilepsy, beginning in the face and confined to the right side, which confirmed the results of ophthalmoscopic examination. The patient was operated on within twenty-four hours, and an abscess was found in the left temporo-sphenoidal lobe and pressing upon the motor area above. Such a case shows conclusively that the question of which side of the brain is involved might be a very important one.

Dr. THOMSON HENDERSON (Nottingham) said: The question of the ipsolaterality of optic neuritis is bound up with the physiological conditions which bring about and maintain the normal intracranial pressure, and a consideration of these conditions supports *in toto* Sir Victor Horsley's contention. Dr. Leonard Hill and myself have recently demonstrated that the tension in the brain and eye both stand at the same level and vary together under all physiological conditions. In the fact that intracranial and intraocular pressures are vascular in origin and nature, and that they both stand at the same capillary venous pressure, lies the key to the pathological manifestations of choked disc. The pathogenesis of optic neuritis not being under discussion at the present moment, one cannot pursue the question further, except to point out that in the viscous mass of the brain, divided as it is by the tense structures of the falx cerebri and tentorium cerebelli, a pressure discontinuity can be maintained in one cerebral hemisphere apart from its neighbour, so that the pressure on one side can mount above that on the other. Normally, the intracranial and intraocular pressures are the same, but experimentally the pressure in one hemisphere, and therefore in one of the optic nerves, may rise above that in the other. Physiological and experimental evidence support Sir Victor Horsley's clinical teaching of the ipsolaterality of optic neuritis.

ACUTE ORBITAL PERIOSTITIS CONSEQUENT ON DENTAL DISEASE.

By N. BISHOP HARMAN, M.A., M.B.Cantab., F.R.C.S.Eng.,
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THAT chronic oral sepsis exerts a most unwholesome effect upon the general health of the affected subject, and in particular upon the digestive organs, is well enough known. There can be scarcely a physician who would fail to insist upon the thorough cleansing of the mouth and teeth when an obstinate dyspepsia has to be treated, or when the patient is subject to repeated attacks of inflamed tonsils. To the ophthalmic surgeon the condition of the mouth is often of very special interest. There are cases of mild but long-continued cyclitis, the evidence of which is mainly to be found in precipitates upon the posterior surface of the cornea—the so-called "keratitis punctata; the cyclitis depends almost certainly upon the irritation of the glands of the ciliary body by the absorption of toxic products from septic foci in the body generally; and most often foci in the mouth and teeth are the sources of the poison. These cases are of mild order, but they are none the less serious in their effect upon the integrity of the eye.

In this communication I shall cite two cases in which the connexion of eye trouble and dental disease was direct and not indirect. The contagion travelled from the teeth to the orbit, with unpleasant enough results in one case, and with truly disastrous results in the other.

CASE I.

W. S., a healthy young woman of 20 years of age. She had suffered no illness within her recollection. In Christmas week, 1907, the bicuspids and first molar of the upper jaw on the left side, which had been carious for some time, became painful. The face swelled up on that side. She attended a dentist, who extracted the teeth, for they were beyond repair; the roots were very septic. The gums healed up well, but the swelling of the face did not decline, it persisted as a hard brawny oedema over the front of the maxilla extending to the internal canthus of the eye.

There was also some oedema of the eyelids. The bone beneath the inner canthus was tender. Hot fomentations were applied to the face continuously, but the swelling did not subside until three weeks after the teeth had been drawn.

Towards the latter part of this time she found that the tears poured over the lid of the left eye, and from thenceforth onwards there had been a constant epiphora.

In December, 1908, I saw her at the West London Hospital. She had a large mucocele on the left side; the contents of the sac were purulent, regurgitation was free on pressure over the

sac; some thickening of the bone could be felt. The sac was syringed out but no fluid passed into the nose. She attended the hospital daily to have the sac syringed. The contents of the sac were a little cleaner for the treatment, but the duct remained impermeable.

Dr. Davis examined the nose but found nothing abnormal therein.

On February 17th, 1909, she was recommended to come into the hospital for examination of the sac under an anaesthetic—she was too nervous to permit of exploration with a probe otherwise—and, if necessary, for excision of the sac.

Operation.—A probe passed into the sac touched bare bone towards the posterior part of the sac. No entry to the duct could be found. The sac was therefore excised and the bare bone scraped. The wound healed by first intention. There is now a scarcely noticeable scar, but the bone remains thickened.

CASE II.

W. W., a robust, well-developed young woman of 19 years, was admitted to the West London Hospital, April 23rd, 1909, with swelling and pain of the face and about the eyes. She came with a note from Dr. J. H. Menzies to the effect that the two upper teeth central incisor had been stopped on March 9th, 1909. The face began to swell on both sides on April 19th. He extracted the two incisor teeth on the 29th, as these seemed to be the origin of the trouble. A discharge of pus from the tooth sockets followed the extractions. This relieved the oedema of the left eye and upper lip, but the oedema and proptosis of the right eye increased. He added, "She can now only faintly see a lighted match with the right eye."

On Admission.—The right eye was greatly proptosed; the cornea projected beyond the level of the left by about 20 mm. The lids were swollen, of a deep purple colour; they did not meet over the globe. The conjunctiva was red, it bulged from between the lids like raw beef, and was sloughy in parts. The globe was immobile. The pupil reacted very feebly to direct light stimulus, but better to consensual stimulation. There was no perception of light. A view of the optic disc was obtained; a marked papillitis was seen. The left eye was normal save that the lids were puffy and discoloured. No proptosis or lack of mobility could be detected. The pupil reacted well. Vision was good and the fundus was normal.

The face on the right side was enormously distended and brawny. The greatest density of the oedema appeared to be over the malar bone. Felt from within the mouth the canine fossa was very tender to pressure, but the palate was not tender. The interior of the nose was healthy. Temperature 102.4°, pulse 104, respiration 28. There was some headache, but no severe pain or mental disturbance.

Operation.—A horizontal incision was made over the right malar bone to reach the orbital margin. Exploration with the little finger released a quantity of pus. The finger could move freely over the face of the bone to the infraorbital foramen of the maxilla below, to the nose inwards, and upwards over the orbital margin far back into the orbit. The bone was bare; tapping with a steel instrument caused the metal to ring as though it had struck a stone. The cavity was irrigated and a drainage tube inserted. Next the antrum of Highmore was explored; an "elevator" was driven through the thin wall of the canine fossa and a cannula inserted; no pus or other fluid escaped.

The pus from beneath the periosteum was examined by Dr. Bernstein, the bacteriologist; *Staphylococcus pyogenes aureus* and *albus* were found. It was proposed to prepare a vaccine therefrom, but the rapid fall of the patient's temperature after the operation rendered this treatment unnecessary.

In the ensuing days the patient made rapid progress towards recovery. Temperature and pulse became normal. The proptosis of the eye gradually subsided, the vision improved. On April 29th she could see the ward sister with the right eye, the lids closed over the globe, and there was some return of mobility. The wound still discharged pus.

May 20th. Proptosis nearly gone. Discharges lessened. When the wound was irrigated with peroxide of hydrogen the fluid bubbled into the mouth. Vision had improved so that she could tell the time from a watch at the distance of 2 ft.

May 25th. Left hospital, treated as out-patient. Proptosis gone; globe fully mobile. Pupil reaction good, but vision not improving. The optic disc shows signs of atrophy.

June 6th. A small piece of bone escaped from the sinus. Optic disc shows distinct pallor. Patient can count fingers with difficulty, "sees objects better sideways."

July 20th. Fragments of bone have escaped from the sinus on three subsequent occasions, the sinus is slowly closing, and the tissues are no longer tender. But the optic disc is becoming progressively atrophic, and there is a large central scotoma; no changes can be detected in the retina or choroid.

REMARKS.

It seems at first sight a far cry from the teeth to the orbital periosteum, especially when the intermediate antrum is healthy. But there are anatomical features in the periosteum of the facial bones which make it a matter of no great difficulty for contagion to pass along it. The periosteum is but lightly fixed to the bones, except at the foramina and along the ridge of the malar where it is attached to the masseter muscle. Further, Gurwitsch has demonstrated that there is a direct capillary venous connexion in this periosteum between the upper and lower veins, which brings the orbital veins almost directly into connexion with the alveolar veins. Notwithstanding these anatomical peculiarities, I must confess to being prejudiced against the acceptance of this route of infection in the first of these two cases; indeed, I was justified in holding a tentative diagnosis, since I had not seen all the stages of the case myself, but with the appearance of the second and more severe case so soon after no doubt could remain. In this latter case the route of the infection from the teeth to the orbit was clearly proved, both at the operation and later by the evidence of syringing along the track of the affected periosteum.

In the literature of orbital disease such cases are rare. A few have been reported, but it appears in most of these there was coincident antrum sepsis. Such cases are those of Jameson Evans, of Hallouer, and of Hirsch. In most of these the orbital disease had followed and not preceded the extraction of the carious teeth; but Hirsch has pointed out that in some the phlegmon diminished with the extraction of the defective teeth.

At the two last meetings of this Section of the British Medical Association considerable attention has been given to diseases of the orbit. In 1907, Fish of Chicago read an elaborate paper showing how frequently sphenoidal sinus disease accounted for hitherto unexplained or "spontaneous" orbital disease. In 1908, one of the subjects for discussion opened by Dr. Mackay of Edinburgh and Mr. St Clair Thomson of London, dealt with orbital disease from the same standpoint. But in none of these instances was dental disease mentioned as a likely cause of orbital infection. Further, in 1907, the Dental Section drew attention to the numerous cases of neuralgias, intraocular irritation, and even more distant disturbances, caused by defective teeth; but no cases were cited such as these two. It would appear, therefore, that they are comparatively rare. It is worth while calling attention to the serious results that may accrue from neglected teeth or from the defective "stopping" of carious teeth. And this, not only from the point of view of the direct consequences possible, but because there can be very little doubt that oral sepsis is responsible in not a few cases for infection of the eye in operative procedure.

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Section of Ophthalmology, BRITISH MEDICAL JOURNAL, November 23rd, 1907, p. 1218; September 12th, 1908, p. 730.

DISCUSSION.

Mr. JOHNSTON TAYLOR (Norwich) asked why it was these sort of cases were so rare seeing that dental caries was so common.

Dr. FREELAND FERGUS (Glasgow) said he remembered seeing several years ago just such a case as the second described by Mr. Harman. In that case the orbital periostitis followed extraction of the tooth, and the antrum was septic, but the eye was saved. These cases could not be explained on a basis of antrum infection, for it was not uncommon to find that cavity full of pus, yet the orbit was not affected.

Dr. A. F. MACCALLAN (Cairo) said that after a long experience of operations for cataract extraction, both at home and in Egypt, he was convinced of the important rôle played by the condition of the teeth in the final effect of operative procedures. In Egypt the crudest operations gave good results because of the general good health of the teeth of a population of vegetarians, whilst in England the best of operations sometimes failed, apparently inexplicably, and he thought that infection from septic teeth was most frequently the real explanation.

ADENOIDS AND ASTHENOPIA.

By W. M. KILLEN, M.D., R.U.I.,
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DURING the past few years I have observed a distinct group of cases of asthenopia occurring among school children and young adults, the cause of the symptoms

being naso-pharyngeal obstruction from adenoid hypertrophy, but in the most up-to-date textbooks in my possession I have failed to find adenoids mentioned in connexion with asthenopia.

Any account of this common children's disease as an etiological factor in producing symptoms of accommodative asthenopia and spasm of accommodation I had not myself observed in current medical literature till my attention was drawn by my friend our President a few days ago to an excellent note on this very subject by Maxwell in the *Medical Annual* of 1898—that is to say, ten years ago. In reading it carefully I find he has forestalled me in publishing his observations, and I may have overlooked quite possibly similar extracts from other authors; and if I have I apologize and wish merely to add my testimony to what they may have already stated. Maxwell said he had observed that a number of cases of ear catarrh in children dependent on adenoid obstruction and hypertrophic rhinitis had been relieved of accompanying asthenopic symptoms by the simple adenoid operation and the reduction of the turbinate hypertrophy. He also mentions what I have also observed—that cases of nasal disease where the chambers were large and showed no obstruction did not, on being subject to treatment, show the same relief to the eye symptoms as cases of marked nasal and naso-pharyngeal obstruction. He also came to the same conclusion as to treatment by correction of errors of refraction as I am about to describe as the result of my own limited observations.

A typical case of adenoid asthenopia is something like this: A parent brings a child or young person of school or early college age, with the statement that the teacher complains that the pupil's sight seems defective. He holds his book or work very close to his eyes and very soon becomes fatigued. The print seems to be mixed up or fades after a little, and there is frequently headache. On examination the patient is found to read the even moderate-size test types at about 5 or 6 in., and we suspect a considerable refractive error. The distant vision is commonly normal, or at least $\frac{6}{9}$, and may be improved by -1.25 sphere to $\frac{6}{6}$ if below it. Under atropin retinoscopy shows no error of refraction or at most a hypermetropia of $+0.75$ or 1 D. We remove the adenoids and all the symptoms of eye trouble at once disappear, including the headaches. My first cases were exactly like this, and I at once commenced to examine digitally the naso-pharynx in all cases in children who showed weakness or spasm of accommodation.

You are, of course, all more familiar than I am with this affection where atropin shows considerably or high refractive errors and where atropin, rest, and suitable glasses give complete relief. Even in the simple case where there is no considerable refractive error or the patient is emmetropic you may get complete relief by atropin-produced rest without glasses, although a balance of cases remains where even prolonged atropin treatment only allays the symptoms, which return on the cessation of the use of this drug. Now I think this small class is usually due to the naso-pharyngeal disease. In examining my cases of all kinds of asthenopia in very young patients I was astonished to find adenoids in 9 out of every 10. But in the great majority I found a considerable refractive error, usually hypermetropia with frequently a good deal of astigmatism.

Since in this class I considered it my duty to correct the refractive errors by glasses, with or without the removal of the naso-pharyngeal hypertrophy, it was not easy to divide the responsibility for the eye symptoms accurately between the ametropia and the nasal obstruction. I found, however, as you all do, I think, that the prescription of the necessary glasses in the cases not operated upon usually gave complete relief. A smaller number of patients with only a low degree of ametropia who had both the adenoid operation and the glasses indicated by examination were so completely relieved that they no longer found any use for their spectacles and threw them aside.

I had one or two cases of diplopia relieved by operation on the throat alone, and at least one of esophoria of a low degree. I am sorry that it did not occur to me to examine for adenoids in my cases of strabismus. Now, I am not at all sure that I am a good friend of these little patients in pointing out fresh fields to be reaped through throat curettage by members of our Section and our neighbours, the rhinologists, as I believe that our profession operate for adenoids in this generation unnecessarily often. I am satisfied from an experience of over 2,000 cases of adenoids in my own practice, most of them operated upon—first, that many children with this condition are in perfect health, and have no symptoms of any kind, although this hypertrophy is easily detected by digital exploration; secondly, that the enormous majority have no eye symptoms; thirdly, that in the case of children with adenoids who show considerable degrees of ametropia, the adenoids are merely an accidental accompaniment and need not be removed, unless glasses fail to relieve, or there are other symptoms demanding relief, such as mouth-breathing and deafness.

I may mention that I was led to examine for adenoid obstruction as an accompaniment of eye disease, first, in cases of phlyctenular ophthalmia, a well-known association even many years ago. I found about 45 per cent. of my patients with phlyctenular ophthalmia had marked adenoid naso-pharyngeal hypertrophy, but I believed as large a percentage of all healthy children had probably this hypertrophy, and also my experience in these cases was that the removal of the vegetations had frequently little or no effect in stopping the phlyctenular troubles. I regard the nasal disease, usually hypertrophic rhinitis, as the result of the same constitutional condition as that which produces the phlyctenular ophthalmia and the adenoids as an accidental accompaniment, and I am glad to see that our highly distinguished guest, Professor Fuchs, in the latest edition of his great classical work on ophthalmology, calls phlyctenular ophthalmia "eczematous conjunctivitis."

Finally, gentlemen, I may state that I have not found adenoids as a cause of asthenopic symptoms in adults over 21 years of age, although one finds these vegetations up to 30, or even a little later in life.

I need not mention the contribution of rhinology, so well known to all of us, in making us acquainted with the relation of inflammatory and other affections of the nasal mucous membrane and the accessory sinuses and various diseases of the eye. I believe there is a great future before this combined research, and I merely bring forward this humble class of selected cases of adenoids and asthenopia for your discussion and criticism as a small addition to the growing number of cases which require the consideration of both the rhinologist and the ophthalmic surgeon.

DISCUSSION.

Dr. W. B. INGLIS POLLOCK (Glasgow) said that the association of enlarged glands with asthenopia was a case of the general rule that refractive errors might not produce headaches and other symptoms until some disturbance of the general health reduced the tone of the system, whether it be due to adenoids or other causes. It was the fact that adenoids and phlyctenular ophthalmia were frequently associated, and were the result of a common cause or diathesis. In the former case the patients should be referred to the family physician for general treatment at the same time that glasses were prescribed.

THE twentieth Universal Cookery and Food Exhibition is to commence at the Royal Horticultural Hall, St. Vincent Square, Westminster, on November 2nd, and is to last a week. The list of patrons includes the governing bodies of a good many London hospitals, and representatives of hospitals are also to be found among the judges. The domestic cookery group contains a subsection for invalid cookery, in which the exhibit is to consist of an invalid tray containing fish, or meat, a light pudding, jelly or custard, and two beverages, including beef-tea or a soup. There are two competitions of this character, the one being open, and the other confined to trained nurses. The prizes in this subsection are gold, silver, and bronze medals, cookery books, and certificates of merit. The names of competitors must be sent in on or before October 11th. This exhibition is not a commercial speculation, but is intended to be, and no doubt really is, of true educational value to the community at large. The profits, if any, will, as on previous occasions, be devoted to educational and charitable purposes, including gifts to the London hospitals. The honorary director is Mr. C. Herman Senn, 329, Vauxhall Bridge Road, to whom all communications should be addressed.

A CASE OF COMPRESSED-AIR ILLNESS CURED BY RECOMPRESSION.

BY

LIEUTENANT G. C. C. DAMANT,

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AND

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SURGEON, R.N.

THIS case of compressed-air illness occurred during salvage operations for recovering the guns and torpedoes of H.M. torpedo boat destroyer *Blackwater*, which sank in 17 fathoms of water off Dungeness after collision with a merchant vessel.

In the course of the operations ninety descents were made by divers to the wreck, the general circumstances being similar to those described below, but in no other case did any symptoms of "caisson disease" appear.

On April 25th, Carpenter's Mate Thomas Milne, together with another diver, went down to the wreck to clear away her anchors and cables. Milne is forty years of age, and of excellent physique. He has been a diver for seventeen years, and never previously suffered from any complaint attributable to his work. He reached the wreck two minutes after leaving the surface, and from then till the time he began to ascend he was very actively exerting himself. In the course of his work he had to clamber right down to the sea bottom and crawl under the forefoot of the *Blackwater*, the gauge at that instant showing the depth to be 98 ft.; but for the greater part of the time he was engaged on her forecastle, which stood up 16 ft. above the sand. The excess of air pressure on his body, therefore, varied between 43½ lb. and 36½ lb. to the square inch. By the time he was ready to return to the surface the weather had become ugly, and a heavy sea threatened to part the wire hawsers by which the diving vessel was moored over the wreck; it therefore became desirable to shorten the time taken in his ascent—that is, the period of decompression—as much as possible consistently with safety from compressed-air illness.

In the whole of the operations the decompression of divers was effected by the system adopted by the Admiralty more than two years ago,* pressure being reduced rapidly at first, and then very slowly, as atmospheric pressure is approached. In practice the diver climbs up a rope towards the surface till on reaching a certain depth he is stopped by a signal from above. He waits for some minutes until a signal is made to ascend, when, after climbing 10 ft. nearer the surface, he is again stopped by signal and for a longer period. The number and depth of the stopping places, and the time to be spent at each, are precisely laid down in the Admiralty Diving Manual, and depend on the depth at which the diver has been working, and the length of time he has been down. An officer manages the ascent of each diver.

The diver had been down under water for exactly one hour when he commenced to ascend, and the following are the extracts from Admiralty tables which apply to the circumstances:

Depth in Feet.	Time Spent under Water.	Stoppages in Minutes at Different Depths.			Total Time for Ascent in Minutes.
		At 30 Ft.	At 20 Ft.	At 10 Ft.	
78 to 84 ft. ...	¾ hour to 1¼ hours	—	10	20	32
84 to 90 ft. ...	40 to 60 minutes	3	10	15	30
90 to 96 ft. ...	55 minutes to 1½ hours	5	15	30	52
96 to 108 ft. ...	40 minutes to 1 hour	10	15	20	48

In the Navy it is the custom when a diver varies his depth during work, to use the decompression times tabulated for the greatest depth he has attained. On this occasion, however, considering the somewhat dangerous state of the sea, and allowing for the fact that far more of his time under water had been spent at 82 ft. depth than at 98 ft., it was decided to hasten matters by using the decompression laid down for the case of one hour spent at 90 ft., but to extend the stoppage at 30 ft. from three to five minutes. Unfortunately, owing to the rolling and pitching of the diving vessel, caused by the heavy sea, it was found extremely difficult to keep the diver at the proper distance from the surface during his stops at 10 and 20 ft., and on one occasion, through misunderstanding a signal, he came right up to the surface, and two or three minutes elapsed before he could be got down again to 20 ft. In our opinion, it is to these irregularities in the decompression that the subsequent illness is to be attributed.

The diver was taken on board at 1 p.m., and the diving dress removed as usual. He appeared perfectly well, and gave a clear account of what he had been doing on the wreck. Soon afterwards, according to his own account, he felt pain in the chest, and began to cough; and a quarter of an hour later he was suddenly attacked by giddiness while walking the deck, and found himself unable to stand. At 2 o'clock his condition was first observed. He was found lying down and pale, with violent nystagmus; though intensely giddy, he was quite clear-headed, and answered questions readily. Arrangements were made at once to transfer him to H.M.S. *Edgar*, which was lying close to the diving vessel, and had the recompression chamber on board ready for use. In the meantime Milne became worse. The pulse, good at first, was now imperceptible, and his condition caused the gravest anxiety. There was no cyanosis or dyspnoea at any time.

In the rough sea it was a matter of considerable difficulty to transfer him from the diving vessel to a steam pinnace, and thence on board the *Edgar*, and the movement made him obviously worse; but by 2.45 he had been got into the recompression chamber, one of us remaining inside it to attend to him, while another worked the air valves from outside, communication being effected by pencil notes held up to the round glass window of the chamber.

Compressed air was admitted without delay, and the pressure within the chamber raised to 17 lb. per square inch. He became much better at once, the pulse returned, and he began to talk, spontaneously describing a sensation of warmth flowing down into his arms and legs, which was no doubt due to the rapid improvement of the circulation.

Owing to the existence of a small leak, the pressure in the chamber began to fall gradually when the admission of air was stopped, and, the rate of leakage being appropriate, decompression was allowed to go on in this way, no manipulation of valves being required. By 3.35 p.m. the pressure had fallen to 7 lb. to the square inch, the patient remaining well and bright; but a few minutes later, while the chamber was being ventilated and the pressure unsteady, he became ill again. The pressure was promptly raised to 15 lb., when he immediately recovered, and the pulse again became good.

At 4 p.m. he was given brandy (passed into the chamber by a small air lock), and the pressure was once more allowed to fall by leakage, the rate of which was now slower, as the door was screwed up more tightly. At 5 p.m. pressure was 7 lb. per square inch, and he was given a cup of soup, having had nothing to eat since 7 a.m. He continued well and bright, though the cold and discomfort of the chamber were obviously telling on him. The pulse was normal, but the nystagmus was still present, though in a far less degree than at first, and he preferred to keep his eyes shut, saying that he did not then see objects "swinging round him," which produced giddiness. At 6.15 p.m. pressure was zero, and the door was opened. As slight exertion (such as a change of posture) had produced faintness while he was inside the chamber a stretcher was employed to carry him to the sick bay of the ship, where he was made comfortable in bed with hot-water bottles.

On examination the heart was regular; the second aortic sound was accentuated. He said he felt quite well. He passed normal urine soon afterwards, and, after taking some soup, fell asleep and passed a good night.

The next morning he said he felt quite well except for tenderness over chest and back where the leaden diving

*For a full description of this see *Report of an Admiralty Committee on Deep Water Diving*, published as a Blue Book in 1908, or "The Prevention of Compressed-air Illness," Boycott, Haldane, and Damant, *Journal of Hygiene*, 1908, page 342.

weights rest. (This is not uncommon after hard diving work.) There was puffiness over both temples and cheek bones, which quickly subsided. The heart sounds were normal, but the heart was slightly irregular. The following day, April 27th, he was quite well and was allowed up for three hours. On April 28th he was up all day, and he returned to duty on April 29th.

The recompression chamber was an upright steel cylinder, 7 ft. high and 5 ft. in diameter, the bottom being convex upwards. It had been constructed somewhat hastily in case of illness resulting from the very deep experimental dives carried out three years ago for the Admiralty Committee. Owing to its small diameter and the convexity of the floor, it was extremely uncomfortable and exhausting to the patient, besides being very cold.

The case presents several features of special interest. The probable cause of its occurrence has already been referred to, and it is evident that in very rough weather great care is necessary to prevent the diver from being prematurely brought up in consequence of the movements of the vessel. A comparatively slight recompression was successful, although one and three-quarter hours had elapsed since the diver came to the surface. In case of illness caused by rapid decompression from great pressures, recompression is often unsuccessful. This is evidently due to the fact that the volume of the air bubbles liberated in the blood and tissues is too great to be successfully dealt with. There seems every reason to believe that the more dissolved air has been got rid of in consequence of precautions taken in decompression, the greater will be the probability of recompression promptly relieving any symptoms, even after a considerable time from their first occurrence. Another point well shown is the extreme caution and deliberation required in decompression after recompression, and the consequent desirability of being able to keep the patient comfortable during this tedious process. The roomy "medical air locks," designed and first used by Mr. E. W. Moir in connexion with tunnelling work in compressed air, are in this respect far superior to the chamber which we employed. As a result of the above experience the Admiralty have initiated the construction of an improved chamber of the same dimensions, but designed to lie on its side, and to be fitted with a bunk, thus making recompression a far less exhausting and anxious experience for all concerned.

Our best thanks are due to Dr. J. S. Haldane, who has very kindly read through our manuscript and added some notes.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

CALOMEL IN ASTHMA.

LIVING in a small fishing town where asthma is rather prevalent, I have been much impressed by the beneficial effects of a dose of calomel as a curative for the attacks of this distressing malady. My patients have been mostly women, and of varying ages, and the attacks present the usual features in varying degrees of severity.

I prescribe a powder of calomel ½ to 2 grains according to the habit of the patient, accompanied, of course, by some of the usual antispasmodic remedies, and my experience is that relief is rapidly obtained, even before purgation takes place.

Other cathartic drugs do not seem to have the same effect or certainly not so rapidly, and the ease with which the powder or tablet is taken is an important factor.

One patient, a widow of about 35, is so pleased with herself after being a martyr to attacks of dyspnoea for years that she is habitually armed with a supply of ½ grain tablets, of which she takes one whenever she feels the slightest "tightness in her chest," and she was most anxious to treat her niece on the same lines for an attack of whooping-cough!

I am sure there is nothing very original in this line of treatment, but it may be interesting to other practitioners who, like myself, are brought into contact with cases of asthma more frequently than usual.

Brixham. CECIL B. F. TIVY, M.Ch., R.U.I.

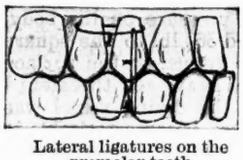
A SIMPLE METHOD OF TREATING CERTAIN FRACTURES OF THE MANDIBLE.

THE method to be described is especially applicable to fractures at the angle of the mandible or in the region of the last molar tooth.

For various reasons it may be undesirable in such cases always to cut down from the outside and wire or screw the fragments in apposition; the only treatment then consists in fixing the mandible to the maxilla in its normal position and maintaining it so until union has occurred. This fixation may be attempted by means of a four-tailed bandage or some modification of the same, which usually fails to immobilize the jaw, and is, moreover, exceedingly uncomfortable for the patient. Interdental splints are practically of no use in such cases, as they fail to secure the smaller fragment and cause too much separation between the upper and lower jaws, which separation may possibly be permanent.

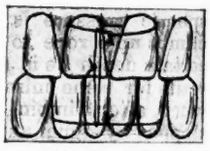
The following method has none of the above disadvantages and has the merit of being so extremely simple that no specialized skill is required in its application, and it can be carried out in a very short time and without any special appliances. It consists simply in fixing the lower to the upper jaw by means of horizontal ligatures passing round the crevices of two or more teeth in each jaw, the ligatures being securely connected by a third vertical ligature.

Reference to Fig. 1 shows the arrangement of these ligatures. They should be of silver gilt wire, but copper or German silver gilt or gold may be used. (Gauge 21 or 20, B.W.G.) The premolar teeth are the most suitable to which to affix the ligatures; they are not so far back to be inaccessible, and the comparative narrowness of their necks make them suitable for holding the horizontal ligatures. All three ligatures are first applied loosely. The horizontal ligatures are next tightened by twisting the wire. The lower teeth are then made to articulate absolutely accurately with the upper teeth, and whilst in this position the vertical ligature is tightened. Ligatures should be placed on both sides of the jaws, as otherwise a small lateral movement may be possible.



Lateral ligatures on the premolar teeth.

The method may be used as a temporary measure in all kinds of fracture of the mandible, in which case ligatures of silk or silkworm gut may be placed round the anterior teeth, as shown in Fig. 2. This affords the patient much relief, and is much more reliable than a four-tailed bandage. The method may also be used as an adjunct to the open surgical methods of wiring the fragments, when fixation of the temporo-maxillary joint may be desirable for a time at least. Even if all teeth are present, the patient does not suffer from inability to take sufficient nourishment.



Anterior or temporary ligatures.

There is always sufficient space between the teeth and behind the last molars for liquid food to pass. Patients do not suffer very much from a diet of milk, porridge, arrowroot, soups, etc., for five or six weeks. In a similar way a patient can use an antiseptic mouth-wash, and use the tongue as a toothbrush on the lingual surfaces of the teeth.

The vertical wire ligature may be left on for a month, after which it may be removed and passive movements allowed; it may be replaced by silk ligatures, as being easier to apply. A vertical ligature should be continued until the sixth week, especially during the time or times the patient sleeps in order to prevent yawning, as the latter does far more harm than even a slight amount of mastication.

The method is, of course, only applicable to those cases in which there is a sufficient number of sound teeth present, but such fractures usually seem to occur in strong vigorous patients with a good set of teeth.

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Reviews.

OSLER'S "MEDICINE."

THE general plan of Professor OSLER'S *Principles and Practice of Medicine*[1] is so familiar that it is not necessary to refer to it in this review. We offer a hearty welcome to the seventh edition of a work which in the past has won such well-deserved approval.

The trend of medicine which Professor Osler has observed since the issue of the last edition is very definite, and some idea of the changes in this edition may be gained from an observation he makes that nothing is more remarkable in the last few years than the rapid advances which have taken place in our knowledge of the acute infections, as shown, no doubt, by the progress made as a result of the discovery of the etiology of syphilis and the adaptation of haemolytic studies to its detection. Another subject to which well-deserved attention is drawn is the work of the Yellow Fever Commission of the United States Army, which has shown that the disease is transferred to man by a mosquito, the *Stegomyia fasciata*, when previously fed on the blood of infected subjects. Practical results of the greatest importance to civilization have followed upon this discovery, for Major Gorgas stamped out the disease in Havana during the years 1901–4, and a slight recurrence in Cuba has again been eradicated; no doubt the specific germ of this disease will be discovered before long. The advances made in the study of bacillary dysentery are fully described, and a perusal of the account of the three types of the bacillus and of the similarity of the intestinal lesion produced by each, recalls the results of the studies on another pathogenic denizen of the intestines—the typhoid bacillus—which is common with allied but distinctly different organisms, produces but one clinical picture and but one macroscopic expression of intestinal damage.

The deliberations of the Congress on Tuberculosis held at Washington last year are made use of for the reader's benefit. Koch's position with regard to the statement made by him, that the bacillus of bovine tuberculosis does not cause human tuberculosis, and vice versa, has been found by our own Royal Commission and Continental writers to be untenable, for bovine and human tuberculosis are interchangeable. Too much has been said, perhaps, of late years of the absence of any proof that tuberculosis is frequently inherited. Such a statement is calculated to overreach its mark, and Professor Osler does well to remind us of Professor Karl Pearson's work, in which he has shown that the diathesis of pulmonary tuberculosis is certainly inherited. So widespread is the risk of infection in urban populations of England that it is doubtful if our artisan classes can escape infection except by the absence of diathesis. The specific treatment of tuberculosis by the tuberculins is acknowledged in certain cases to have a definite value, but the independent work in America and England appears to be against accepting opsonin measurement as a reliable guide to the reaction of the body as a result of vaccination; no doubt similar criticism of the reliability of opsonin estimations accounts for the fact that Professor Osler does not refer to its diagnostic value in cases of chronic tuberculosis; von Pirquet's test is not even referred to, and yet there are good reasons for preferring it to the ophthalmo-reaction, and it would appear to be as much or as little reliable.

Another infection which has received special attention is that by the pneumococcus, and reference is made to the work of the New York Pneumonia Commission, which has largely extended Netter's observation on the occurrence of this organism in the body; it was found that the majority of people harbour the organism in the mouth, nose, or throat, so that a catarrh of the upper nasal passages, exposure, alcoholism, etc., by lowering the defensive powers provide the opportunity for the organism to become pathogenic.

So far we have referred to advances in the subject of infection, a principle which year by year is shown to be of increasing importance in the study of medicine. The reader will, however, find that Professor Osler has not failed to put before him the advances made in other directions in which infection has not been found to be immediately responsible for the changes that have been brought about in the body. Freund's theory has been revived as an explanation of the development of emphysema, more especially in the young. This theory attributes the change to alterations in the cartilages of the first three pairs of ribs, which undergo chronic hyperplasia and premature ossification. Professor Osler offers the suggestion that resection of these ribs would be indicated in such cases. Reference will be found to the views put forward by Marie that the older conception, according to which motor aphasia is due to a lesion in Broca's convolution, is erroneous; according to Marie such a defect is due to a lesion involving the left lenticular nucleus and the adjacent tissue. Marie's views have been severely criticized, but the result nevertheless is that though the older localization is affirmed, it is also true that lesions of the lenticular zone interfere with the mechanism by means of which speech is made possible. We would commend the section dealing with neurasthenia (psychasthenia), the description of the treatment of which is embellished with one of those masterly pieces of literary workmanship to which we are so frequently treated in Professor Osler's writings; the paragraph is short, but it says what should be said for faith healing with much trenchancy and wisdom. All the additions made in this seventh edition need not be mentioned; the reader will discover them for himself, and may feel fully assured that little of the advances made in medicine since the publication of the last edition has escaped the writer's notice.

[1] *The Principles and Practice of Medicine.* By William Osler, M.D., F.R.C.P., F.R.S., Regius Professor of Medicine, Oxford University. Seventh edition. London: Appleton and Co. 1909. (Roy. 8vo, pp. 1160; charts and coloured diagrams. 21s.)

HEREDITY AND DISEASE.

IN view of the importance of studying *The Influence of Heredity on Disease* the Council of the Royal Society of Medicine has published in a separate volume, bearing this title, the discussion on heredity which was held by the society during November and December, 1908.[2] In his introductory address, the President of the Society, Sir William Church, referred to the vexed problems of mutation and Mendelism, and remarked that the various facts on which Mendel's laws are based were known to Darwin, although he did not work out the numerical proportions of the variations which he observed. The president also discussed, amongst other subjects, Weismann's doctrine of the continuity of the germ-plasm, and the analogy between cancer formation and the growth of galls. He was followed by Sir William Gowers, who opened the discussion with regard to diseases of the nervous system. We have already published *in extenso* the remarks of this distinguished neurologist, who presented a valuable collection of clinical data pointing to the influence of heredity in diseases of this class (BRITISH MEDICAL JOURNAL, 1908, vol. ii, p. 1541). Professor Bateson put forward the arguments in favour of the Mendelian theory, and the debate was continued by Drs. Savage, Mott, and Mercier. Dr. Mercier directed attention to the logical fallacies with which the subject is beset, and, in particular, to the dangers of the *argumentum per enumerationem simplicem*. The mere enumeration of data showing that in certain cases insanity or other forms of nervous disease run in families does not amount to a proof that these diseases are hereditary; we must also take into account cases in which the appearance of such diseases is not followed by their repetition in subsequent generations of the same family, and, furthermore, cases in which these diseases arise *de novo* in previously normal families. The evidence for or against hereditary influence cannot be logically assessed at its true value until substantial information upon all these three aspects of the problem has been accumulated. Professor Karl Pearson, who took up the discussion later on, supported this plea of Dr. Mercier's as to the necessity of obtaining statistics of normals as well as abnormals. He criticized in detail many of the arguments which had been brought forward in favour of Mendelism, and gave his reasons for believing that their supporters had not proved their case. "My own standpoint," he said, "is that there is no definite proof of

[2] *The Influence of Heredity on Disease, with special reference to Tuberculosis, Cancer, and Diseases of the Nervous System.* A Discussion opened by Sir W. S. Church, Bart., K.C.B., M.D., Sir William Gowers, M.D., F.R.S., Arthur Latham, M.D., and E. F. Bashford, M.D. London: Longmans, Green and Co. 1909. (Imp. 8vo, pp. 154. 4s. 6d.).

Mendelism applying to any living form at present; the proof has got to be given yet." The discussions on the influence of heredity upon tuberculosis and upon cancer were opened respectively by Dr. Latham and Dr. Bashford. Amongst other problems which figured largely in the debate were the hereditary transmission of albinism and the inheritance of other distinctive features in pigmentation or morphology. We congratulate the Royal Society of Medicine on having collected expressions of opinion upon the important subject of heredity in disease from so large and representative a body of men. The value of the debate would have been enhanced if it had been possible to formulate some general conclusions. But this could hardly be expected, as the subject is still in the throes of controversy, and the available evidence which will bear the test of scientific scrutiny is relatively small. In closing the debate, the President described it as "extremely interesting and somewhat profitable." Perhaps there is justice in the "somewhat" with which he qualifies this eulogium, though, as he makes no attempt at a judicial summing up of the points which merit this faintly damnatory praise, the criticism is not particularly helpful. Many of the speakers treated the debate as an opportunity for contributing their views on the Mendelian controversy, and made no effort to limit their remarks to the subject of disease. It would have been an advantage if the discussion had been divided up into two separate debates—one devoted exclusively to the Mendelian theory in all its aspects, and the other confined with equal strictness to the evidence of facts concerning the hereditary transmission of disease, regardless of theories about the laws of heredity.

The third part of *The Treasury of Human Inheritance*[3] maintains the high standard of its predecessors, a statement which those who have examined Parts I and II will acknowledge to be the highest possible praise. In this third part Dr. Bulloch deals with angioneurotic oedema and hermaphroditism, Dr. Urquhart with insanity, and members of the Galton Laboratory staff contribute pedigrees illustrating the inheritance of various kinds of ability. Where all is so good it is difficult to single out any one part for special commendation. Dr. Bulloch's article on hermaphroditism will be of peculiar interest to that large number of readers who have found the literature of this subject extremely confusing. No authentic case of the co-existence of an ovary and testis in the same person is on record, and only five genuine cases of both ovarian and testicular tissue occurring in one and the same gland. In none of these cases were both tissues functionally perfect. Most of the recorded cases are examples of *pseudohermaphroditismus masculinus*; in the complete form there are testes, vasa deferentia, and prostate, but also some development of Müller's ducts, the external genitals being apparently of female character. In this section 56 pedigrees are engraved, the most complete being Lesser's, which deals with five generations, comprising 57 individuals, of whom 11 were affected. Only 2 of these were personally examined by Lesser, but he considered the information obtained respecting the others to be trustworthy. The malformation was hypospadias; in one subject the prepuce was short, and on the lower surface of the glans was a wedge-shaped depression with a minute opening ending blindly, while about a centimetre behind this was the orifice of the urethra, and between the two was a small opening from which some drops of urine came. In another member of the family the condition was almost the same, except that the minute opening between the depression and the urethra was further back. These two were brothers; the father was normal, but the grandfather and great-grandfather were probably affected. One of the two had three normal children, the other no recorded offspring. The article on angioneurotic oedema includes Ensor's case, revised and extended for the *Treasury* by Dr. Ensor. The family as published consists of 141 members in seven generations, of whom 28 males and 21 females were certainly affected. We desire once more to congratulate Professor Karl Pearson and his coadjutors, and wish this venture the success it deserves.

[3] *The Treasury of Human Inheritance.* Part III. With 11 plates of pedigrees and 1 plate in colours. London: Dulau and Co. 1909. (6s.)

EMBRYOLOGY.

THE ova of many marine animals undergo a change immediately after the entry of a spermatozoon, which results in the development of a so-called membrane—the "fertilization membrane" produced by swelling and liquefaction and final precipitation of a substance in the surface of the ovum. Professor JAQUES LOEB in his last publication on artificial parthenogenesis[4] says that he can produce this membrane in starfish eggs by the action of a monobasic fatty acid for a short time, and that all the ova so treated, if then put into a hypertonic solution of sea water for some half-hour, develop into free-swimming larvae. The hypertonic solution must contain oxygen. Eggs which are acted on by the fatty acid and are not put into the hypertonic solution of sea water die at room temperatures and more quickly at higher temperatures, but may develop if the temperature be kept very low. Eggs can be protected from death after the development of the membrane by keeping them in sea water deprived of oxygen or to which a trace of potassium cyanide has been added. Loeb concludes that the action of the spermatozoon resembles that of a lysin; the first stage is a lytic process resulting in the alteration of the surface and changed relation of the ovum to the solution which forms its environment. The fatty acid can take on the lytic action of the spermatozoon; so, too, can any other lysin such as soap solution, saponin, etc. The change of the egg from the active to the resting stage is associated with increased oxidation—oxygen, hydroxyl ions, and possibly other substances entering into the egg from the sea water. The lytic process is too rapid when set up by a fatty acid, and ends in death unless the temperature is very low. Exposure to low temperature, temporary withdrawal of water by immersion in a hypertonic salt solution, or withdrawal of oxygen allows the lysin to be anchored, neutralized or destroyed, and then the parthenogenetic development proceeds as far as the pluteus stage. The spermatozoon on its entry not only produces the lytic action, but by some other chemical action controls it and prevents it proceeding too far. The fact that a superficial lytic process starts the development of an ovum is of pathological interest, for as all foreign serums and body fluids have a lytic effect, it is possibly due to a similar mild lytic process produced by their excretions that tubercle bacilli provoke the formation of tubercles, while other unknown parasites or changes in internal secretions may similarly provoke the formation of tumours. Professor Loeb has done most admirable pioneer work in breaking away from the mechanical theories of histologists, with their centrosomes, astrosphere formation, etc., and by showing that these structural details can be produced not only by the entry of a spermatozoon, but by the action of hypertonic solutions. It is by physico-chemical methods that these great problems must be attacked, and the reader will find much that is interesting and suggestive in Professor Loeb's new work.

The *Textbook of Embryology*[5] which Dr. BAILEY and Mr. MILLER have produced is very well adapted to the purposes of the medical student and medical practitioner. The general principles and the main facts of the subject are clearly, shortly, and definitely stated, and the peculiar features special to human development are carefully noted. For the main part the authors keep to the plain, broad road of description; they avoid polemic discussions, and on subjects upon which opposite opinions are held they either adopt one or they mention the more important. On the whole, the various sections are well up to date; that dealing with the nervous system is, perhaps, the most complete and interesting, and the chapter devoted to teratogenesis will prove very useful to every one interested in abnormal development and its results. At the end of each section the authors have inserted suggestions and instructions regarding the best methods of obtaining, preserving, and preparing specimens similar to those upon which the descriptions are based. The suggestions and instructions may be valuable to those who can command the necessary appliances and facilities, which, however,

[4] *Die chemische Entwicklungserregung des tierischen Eies.* By Professor Jacques Loeb. Berlin: J. Springer. 1909. (Med. 8vo, pp. 283, fig. 56. M. 9.)

[5] *Textbook of Embryology.* By F. B. Bailey and A. M. Miller. London: J. and A. Churchill. 1909. (Sup. roy. 8vo., 686 pp. and 565 figs. 21s.)

are only to be found, as a rule, in well-equipped embryological laboratories. The illustrations are mostly borrowed from the works of other authors, and the majority are well selected and well reproduced, but here and there photomicrographs of sections of chick embryos, which were evidently not in a very good state of preservation, have been somewhat heedlessly introduced when better figures might easily have been obtained. It has already been mentioned that the authors have generally avoided discussion regarding disputed points and have contented themselves with recording the more important opinions—a plan well adapted to the type of book they have produced; but in their selection of opinions concerning the development of the vitreous of the eyeball they have scarcely given sufficient prominence to the view that the primary vitreous consists not of secretion from retinal cells, but of processes of those cells more or less comparable to the processes which become the sustentacular fibres of the retina. This omission is, however, a very small blemish, and can scarcely be said to detract from the value of a book which is well arranged, well illustrated, well printed, readable, interesting, and not overloaded with unnecessary detail. Its good qualities are numerous, and will commend it to all who are interested in or who are desirous of studying the subject with which it deals.

ANATOMY.

THE volume of Professor KARL VON BARDELEBEN'S handbook of human anatomy[6] devoted to the consideration of the bones of the upper and lower extremities, and that which treats of the muscles of the upper extremity, maintain the standard of the preceding sections with regard to the amount of information and detail they supply. The volume which deals with the bones of the extremities is written by Professor W. Krause. It contains rather short but clear descriptions of the individual bones; a consideration of their architecture, in which Dixon's researches on the laminae in the femur are not included, though other investigations of less interest are mentioned, and chapters on the development, the ossification, and growth of the bones of the extremities. Other sections treat of the homologies and varieties, and the latter part of the volume is devoted to a survey of the bones in the groups of animals which may be considered as man's more immediate relations. The book is an extremely valuable contribution to anatomical literature, and is obviously the work of a master of his subject. The text is worthy of better illustrations, and it is somewhat remarkable, in a book of this type, to find the femur depicted in so inadequate a manner. The volume which deals with the muscles of the arm is the work of Dr. Frohse and Dr. Max Fränkel, and is the most complete account of the muscles of the human arm which we possess. The work upon which the greater part of the text is based was commenced in 1897, when Professor Bardeleben and Dr. Frohse communicated to the Anatomical Society of Germany a paper dealing with details of the innervation of the human limb muscles, and Dr. Frohse read a paper upon the finer ramifications of nerves in the muscles at the meeting of the Anatomical Society of Great Britain and Ireland held in Dublin. Since that time the authors have devoted themselves to a detailed and minute investigation of the shape, size, weight, method of attachment, surface contour, actions, relations, and nerve supply of muscles. It will be readily understood, therefore, that the book which is the outcome of part of their work teems with facts; in addition it is embellished with illustrations which increase the value of the text, and which will be of value to artists as well as to anatomists, whilst the explicit and exact descriptions and illustrations of the points where nerves can best be stimulated will be serviceable to physicians and surgeons.

The first part of Dr. TOBY COHN'S work upon the palpable forms of the normal human body was reviewed in the BRITISH MEDICAL JOURNAL of August 19th, 1905, p. 388. The second part, which deals with the lower extremity, is now published.[7] It displays the same thoroughgoing and painstaking accuracy as the volume devoted to the upper extremity, and we need not repeat our commendation of the general merits of the work. Dr. Cohn divides the extremity into eleven carefully defined regions from the buttock to the toes. Everything that it is possible to make out by palpation or inspection is minutely described, and the visible forms are shown in a large number of photographs, which have been reproduced for this work. It will be useful to those artists who want to know the names of the forms which they paint or draw, as well as to students of medicine, whom it should stimulate to verify their knowledge of anatomy by palpation and close inspection, thereby cultivating the *tactus eruditus* and acquiring a useful familiarity with the normal, which will render the recognition of departures from it easy and sure. Once more, however, we must protest against multiplication of names and the use of German terms, where the universally-known Latin ones answer every purpose. It is bad enough that the scaphoid bone should be called, in the space of a page or two, "Kahnbein," "Schiffbein," and "os naviculare"; but why should the ilio-tibial band be called "tractus iliotibialis" in Fig. 44 of Plate VI and "Massiatscher Streifen" in Fig. 45 of the same plate?

EXPERIMENTAL PHARMACOLOGY.

DR. C. W. GREENE states, in the preface to his *Experimental Pharmacology*,[8] that "it is only on such intimate personal experience with the facts that one can reach a rational understanding of the principles of pharmacology." We may be disposed to accept this statement while at the same time insisting that the experiments should be carefully chosen so as to bear as far as possible upon the action of drugs in man. In the present book experiments on animals are described in considerable detail, but their significance is not discussed, and oftentimes drugs are shown to produce in animals effects of a nature which can never occur in man. Thus, on page 18, the effect of perfusing the mammalian heart with 0.5 per cent. of morphine is described; it seems to us that the student who faithfully performed such an experiment would become impressed with the idea that morphine was a powerful cardiac depressant. In reality, of course, morphine administered in any dose would paralyse the central nervous system long before it showed any toxic effect on cardiac muscle. This experiment is typical of the descriptions that occur throughout, and the book, therefore, cannot be regarded as the type which it is desirable to place in the hands of the student who studies pharmacology with a view to the practice of medicine. The descriptions of experiments are insufficient for the novice and of little value for the English medical student, involving as they do the estimation of blood pressure and urinary flow upon anaesthetized mammals. The book is freely illustrated, but many of the illustrations are worse than useless to the student of medicine. Thus, no less than three are given to show the "depressant" action of morphine upon the heart.

PATHOLOGICAL ENTOMOLOGY.

A SCHEME for the preparation of a monograph dealing with blood-sucking insects in general was made by Sir E. Ray Lankester while director of the Natural History Department of the British Museum; he was no doubt moved thereto by the great practical importance attaching to these insects since it has been shown that they act as the carriers of certain diseases. Unfortunately the collections of such insects contained in the museums are very incomplete, perhaps because the diptera, or two-winged flies are not only unattractive in form, but for many and on the whole sufficient reasons, are regarded with dislike by most people. Some time ago the Trustees of the British Museum decided, on the suggestion of Mr. Charles O. Waterhouse, assistant keeper in charge of the insect section,

[6] *Handbuch der Anatomie des Menschen.* Von Professor Dr. Karl von Bardeleben. Band I, Abteilung 3, *Skelet der oberen und unteren Extremität.* Von W. Krause. Band II, Abteilung 2, Teil 2, *Die Muskeln des menschlichen Armes.* Von Dr. Fritz Frohse und Dr. Max Fränkel. Jena: Gustav Fischer. 1908. (Sup. roy. 8vo, pp. 254 and 434 respectively; Lfg. 15. M.24.)

[7] *Die palpablen Gebilde des normalen menschlichen Korpers und deren methodische Palpation.* Nach eigenen Untersuchungen an der Leiche und am Lebenden von Dr. Toby Cohn, Nervenarzt in Berlin. Part II, Lower Extremity. Berlin: S. Karger. 1908. (Sup. roy. 8vo, pp. 376, 39 illustrations, 16 in the text and the rest in 9 plates. M.6.40.)

[8] *Experimental Pharmacology: A Laboratory Guide.* By Charles Wilson Greene, Ph.D. Third edition. Philadelphia: Blakiston's Son and Co. 1909. Med. 8vo, pp. 86; 37 illustrations. $1.)

to issue a series of volumes dealing with blood-sucking diptera as the materials became available. Four volumes on mosquitos prepared by Mr. F. V. Theobald, were issued between 1901 and 1907, and a fifth volume is in preparation. The tsetse-flies were described by Mr. E. E. Austen in a volume published in 1903, and the Trustees have now issued a volume entitled *Illustrations of African Blood-sucking Flies other than Mosquitos and Tsetse-Flies*.[9] This volume, which has been prepared by Mr. E. E. AUSTEN, consists of an introduction and enumeration of the families and genera mentioned, descriptions of each species, lists of African blood-sucking flies exclusive of mosquitos and tsetse-flies, arranged under countries, and thirteen plates containing over a hundred coloured drawings of the insects described. Mr. Austen, in his introduction, states that the book applies to the Ethiopian zoo-geographical region, that is to say, to the whole of Africa with the exception of Tripoli, Tunis, Algeria, and Morocco. Dahomey and German South-west Africa are also, perforce, omitted, as no collections or specimens of diptera from those regions have yet reached the museum. With regard to the geographical lists, Mr. Austen has to state that they are of the most fragmentary description, owing to the small amount of material at present available, and we trust that his expectation that the very imperfection of the lists will stimulate further work may be fulfilled. Though the blood-sucking flies of Africa belong to the same families as those found elsewhere, certain genera of Tabanidae, as well as the tsetse-flies are confined to the Ethiopian region. Mr. Austen gratefully acknowledges the assistance rendered by many colonial medical officers in Africa during the last few years, who, acting under official encouragement, in compliance with instructions from the Colonial Secretary, have made and forwarded to the museum collections of blood-sucking flies occurring within their districts. Had it not been, he says, for their efforts, "the production of this book would have been well-nigh impossible," but in a concluding paragraph he says "that in the matter of practical investigation by means of experiments on the spot, in order to determine the conveyance or non-conveyance of disease by means of blood-sucking flies other than mosquitos and tsetse-flies, the British have as yet lagged somewhat behind other nations." The information given as to the bionomics of the families, subfamilies, genera, and species mentioned is as full as possible, but in the case of many of the species the data at present available are limited to a record of localities and dates. The all-important subject of the dissemination of disease has been kept prominently in view, and the statements of investigators and observers who have devoted themselves to this question will be found summarized under special headings. The coloured drawings have been admirably made by Miss Grace Edwards, and are very well reproduced. The book, which is provided with an adequate index, is altogether an excellent example of how such a piece of work should be done. We can only regret, having regard to the importance of the volume finding its way into the hands of all workers in this field both at home and abroad, that it should have been necessary to issue it at so high a price.

Professor BLANCHARD has issued the first fasciculus of a systematic work, entitled *L'Insecte et l'infection*,[10] in which he proposes to deal as fully as present knowledge permits with the natural history and medical importance of pathogenic arthropods. It ought to prove very useful, especially to those engaged in the study and practice of tropical medicine. This first fasciculus is devoted to the natural order Acarina, of which by far the most important group or family is the Ixodidae, or ticks. The whole book, in fact, with the exception of a few pages at the end, is devoted to this little-studied group of parasitic insects. After a preliminary chapter on the definition of the Acarina, in which a table of classification is given, the morphology and anatomy of the ixodides or ticks is discussed. The study of the internal anatomy of ticks has always been specially tedious, owing to the difficulty of being able to cut good sections on account of the hard, chitinous coat in which the insect is enclosed. A very clear account is nevertheless given of the external and internal anatomy, free use being made of the excellent diagrams of sections by Bonnet, who has done a large amount of work in this branch of the subject. A few more schematic diagrams, representing the whole of the alimentary system and showing also the salivary glands and Malpighian tubes, would have been very useful; students of mosquitos will remember such schemes in Theobald's monograph on these insects. However, even without these a thorough grasp of the important anatomical features can be obtained. The digestive apparatus is distinctly peculiar, and the voluminous glandular apparatus, consisting of salivary glands proper and poison glands, cannot be too closely studied when it is remembered that it is through these that the piroplasmata and spirochaetes must find their way, in some form or other, back to their mammalian or avian hosts. On the whole, the anatomy is somewhat more complicated than that of mosquitos and other dipterous insects. The third chapter deals with the evolution and biology of the ticks—a subject on which a good deal has been written, much information being available as to the habits of the different genera and species. We do not notice any reference to those ticks whose larval and nymphal stage are said to be passed completely on the same animal. Such a train of events does occur, though perhaps it is commoner for most to revisit the external world before undergoing a further stage in their life development. More observations as to the habits of the males and the natural enemies and parasites of the ticks are also needed. There is, for instance, a general impression that the ordinary starling, when seen, as it frequently is, sitting on the back of a sheep, is feeding off the ticks and other insects to be found in the fleece. The question also of parasiticides for ticks when infesting animals is very important. Good work may be done on the value of different washes, or powders for dusting on the skin, to keep these pests down. The fourth, and last, chapter deals with the classification of the ticks, and no fewer than 107 pages are devoted to this subject. Neumann's classification is more or less closely followed, but the chapter, like all systematic work of this kind, is necessarily very technical. The number of species has been considerably increased of late, and some new generic names appear also. Pen-and-ink diagrams and sketches help to simplify some of the special points. The absence of a table of contents or index is a fault in a publication so full of detail, and the omission ought to be rectified when the other parts appear. The work should supplement, though not replace, the recent English work on ticks by Nuttall and his collaborators at Cambridge.

[9] *Illustrations of African Blood-sucking Flies other than Mosquitos and Tsetse-Flies.* By E. E. Austen. London (printed by order of the Trustees of the British Museum): Longmans and Co., B. Quaritch, Dulau and Co., and at the British Museum (Natural History). Sup. roy. 8vo, pp. 236; 13 coloured plates. 27s. 6d.

[10] *L'Insecte et l'infection, Histoire naturelle et médicale des arthropodes pathogènes.* Par Raphaël Blanchard, Professeur a la Faculté de Médecine de Paris; Membre de l'Académie de Médecine. Premier Fascicule: Acariens. Paris: Libraire scientifique et littéraire. 1909. (Sup. roy. 8vo, 160 pages; 197 figures. Fr. 6.)

NOTES ON BOOKS.

DR. MALAESIDA, who is already known for his writings on pharmacology and materia medica, addresses himself in his new book on the art of prescribing and applying remedies[11] mainly to the advanced student and to the young practitioner, and, with these requirements in view, he lays stress chiefly on the commoner and practicable methods of treatment, not necessitating the use of costly apparatus or special skill in their use. In the nineteen chapters very much the usual lines are followed—drug idiosyncrasy, the form of prescription, incompatibility, antidotes, epidermic and hypodermic uses of drugs, baths, anaesthetics, bleeding, and uterine applications, are each dealt with in turn. An excellent feature of the book is the very full index, running to twenty-seven pages, whereby any drug or remedial application can be quickly referred to and consulted. Like all the Hoepli manuals, the book is of a convenient size for the pocket.

The late Mr. HENRY SETON MERRIMAN had a remarkable power of contriving a plot and telling a story, and as, after all, the first duty of a novelist is to tell an interesting story, it is not surprising that his novels were successful. It is not, however, every successful novelist who will bear reprinting for another generation; but judging from a perusal of the first two volumes in Messrs. Smith, Elder,

[11] *L'Arte di Prescivere e di Applicare i Rimedi.* Dott. G. Malaesida (Manuali Hoepli). Milan: U. Hoepli. 1909. (Pott 8vo, pp. 412. L.3.50.)

and Co.'s thin-paper edition, *The Slave of the Lamp* and *The Sowers*,[12] Merriman will stand the test well. In spite of all that has happened in Russia since 1896, perhaps partly because of what has happened, *The Sowers* reads quite freshly, for Merriman, as was his wont, had studied Russian life carefully on the spot, and probably understood the Russian character better than most foreigners. The new edition is to be published in fourteen volumes, and will be completed on November 17th. The first volume contains a preface, which embodies a short biography of Merriman—all, it would appear, that the public is to expect.

[12] *The Slave of the Lamp* and *The Sowers*. Vols. i and ii of the thin paper edition of Henry Seton Merriman's novels in fourteen volumes. London: Smith, Elder, and Co. 1909. (Fcap. 8vo, pp. 355 and 454 respectively. Cloth, 2s.; leather, 3s.)

THE SIXTEENTH INTERNATIONAL CONGRESS OF MEDICINE.

BUDAPEST, AUGUST 29TH TO SEPTEMBER 4TH.

(*Continued from page 801.*)

ENTERTAINMENTS.

Reception by the Lord Mayor.

On the evening of Monday, August 30th, the Lord Mayor of Budapest received the members of the Congress at the Town Hall (Redoute). A large gathering collected in the handsome building at 9 o'clock, and remained until 11. In the large hall an orchestra performed, and several lady and gentlemen artistes contributed to the success of the evening. A lady, whose name was given in the programme as Miss Marschalko, but whose identity as the wife of a professor of medicine of the University of Budapest was soon disclosed, received much applause for her rendering of some German songs. At about 10 o'clock the doors of the buffet were opened, and a rush ensued, fortunately without accidents. A large placard, bearing the magic words, "The guests are requested to pass out of the buffet after fifteen minutes," apparently caused dismay to some, but was generally ignored. Champagne and sweets were to be had in the first room, but, further in, more solid refreshment was provided.

Reception by the Ladies' Committee.

On Tuesday evening the Ladies' Committee gave a reception to those members who were accompanied by their wives and daughters. This was held in the Stadtwäldchen (City Park) and was a great success. The tables were spread in the open air, the surroundings were extremely beautiful and all apparently enjoyed themselves thoroughly. On the same evening the German members held a social reunion, to which several foreign guests were invited.

Reception at the Royal Palace.

On Wednesday evening the Archduke Joseph received the members of the Congress in the name of His Imperial and Royal Apostolic Majesty. Some 1,500 invitations were issued, although it was stated that more than 800 had never previously assembled in the apartments. The palace is situated on the hill on the Ofen or Buda side of the Danube, and the police had issued instructions that the cabs proceeding to the palace should pass over the bridges without the payment of the usual toll. A long string of single- and pair-horse cabs and motors raced up the hill and lined the carriage way leading to the Royal abode at an early hour. In the palace, the scene which met the eye was a most impressive one. The handsome staircase, with its massive marble walls and columns, was richly decorated with ferns and palms. A bright red carpet paved the broad stairs, and on each side picked soldiers of the Royal Body Guard, in red and gold uniforms and glistening helmets, completed a most picturesque scene. The guests were conducted to the Ceremonial Hall, where opportunity for conversation was given. The official delegates were required to line up in groups according to their nationality, and each batch was called upon by Count Apponyi, supported by Count Zichy, the Court Minister and two Secretaries of State, von Bolgár and von Molnár, to proceed to the Hapsburg Apartments, where the Archduke was prepared to receive his guests. The British delegates were kept waiting for a considerable time, but were received in audience before 10 o'clock, and each group were addressed in friendly and interested words by the Archduke. At about 9 p.m. champagne, ices, sandwiches, and lemonade were served, according to the custom of the Court, on trays carried around by servants. Although the Archduke had retired at about 10 o'clock, the members remained for a full hour later, and a pleasant evening was spent.

Receptions by Presidents of Sections.

Thursday evening was reserved for the receptions by the Presidents of the Sections. The general secretary, Professor Gróss, gave a large "at home" at the Park Club, while various other entertainments were well attended. Your correspondent was invited to a dinner given by the President and local committee of the Otological Congress, which served at the same time as the Otological Section of the Medical Congress. This dinner was tastefully arranged, and among the guests were a fair sprinkling of English, a large number of American, and a few German and French. Professor Lichtenberg, a most interesting and amiable man, spoke first in French, then in German, and lastly in English—a language which, it is said, he had studied specially for this Congress—and extended a warm welcome to all the foreign members and their ladies present. Professor Pritchard replied for England. A Hungarian Gipsy Band played the various national anthems as a representative of each country rose. The music was perhaps more impulsive and resonant than artistic, but in any case it was appreciated by those present.

Performance at the National Theatre.

A performance of Madach's *Tragedy of Man* in Hungarian was given at the National Theatre on Wednesday evening. A limited number of members were enabled to obtain seats. An excellent summary of the plot of the play in three languages was distributed. This assisted the audience in following the plot, and, together with some artistic acting, rendered the play intelligible and enjoyable to the foreigners. The revolution scene was especially appreciated.

Reception by Count and Countess Apponyi.

On Friday evening one of the most brilliant and, at the same time, most successful *soirées* was held. Count Apponyi and the Countess received some 400 members at the Park Club in the City Park. The club house is most beautifully situated in the neighbourhood of the lake and is elegantly appointed. A commanding staircase, leading from the entrance to the reception rooms, was tastefully decorated. At the head of this staircase, just within the portals of the large hall, the Count and Countess stood and received their guests. Each one received a few words of greeting in his or her native tongue, spoken by the Count with no perceptible accent. Within there was a brilliant gathering. Among the Hungarian Ministers and members of Parliament present were Counts Zichy, Tóth, Molnár, von Bezerédi, Náray-Szabo, Thurn-Taxis, Fontenay, and Boda. An attractive figure further presented itself in the person of the Cardinal, Graf Peter Bay, whose literary achievements and enterprising feats in connexion with the Far East have secured for him a world-wide reputation. An excellent orchestra played a suitable programme of music during the evening. After a short interval, which was pleasantly spent in conversation, the guests were ushered into the rooms on the ground floor, where there was an excellent buffet. Some sought the refreshing air of the verandah, while others preferred the luxury of the various apartments. The guests included representatives of every nation—for the most part the official delegates and the representatives of the medical press. A rumour had gone abroad the day before that an appeal addressed by a German society in Vienna to the German members attending the Congress, calling upon them to refrain from attending any function at which Count Apponyi was officially present, had fallen on fruitful soil. The reason for this request was the recent order to exclude the teaching of the German language in the Hungarian elementary schools, which owed its inception to Apponyi. While this is not the place to discuss matters of a political nature, it may perhaps not be superfluous to state that the tendency of the present Ministry is to support the feeling of independence of the Hungarian race, and to foster the feeling of animosity felt towards the

races living among the Hungarians, but wholly distinct from them. On the evening of Thursday, the behaviour of some of the German representatives, either accidentally or intentionally, gave support to the rumour, but on Friday it became clear that the appeal had failed. The Germans were well represented, and no trace of ill feeling could be detected. This action of our German colleagues is all the more to be applauded since the atmosphere of Budapest seems to be especially adapted to political ferment, and yet there can be no shadow of a doubt that in the great world of medicine, fraternal feelings and unanimity must reign supreme.

Semmelweis's Monument.

In the Erzsébet-ter, a fine monument of Semmelweis, of which an illustration was published in the JOURNAL of September 11th, p. 707, attracted much attention. During the course of the week numerous wreaths with appropriate inscriptions were deposited at its foot, and in several instances messages of appreciation were dispatched to the members of the great obstetrician's family.

The Eighth Section (Gynaecology) met on Wednesday, September 1st, at the monument, and some speeches were delivered. The wreaths were laid down by the representatives of the various countries.

Washington's Monument.

On Monday the Americans assembled at the statue of Washington, and were supported by Count Apponyi. Here wreaths, flags, speeches, and song demonstrated the reverence with which his countrymen held the great hero of freedom.

Esperanto.

A meeting of the members desirous of extending the use of Esperanto took place on Tuesday morning. The number attending was fair, but outside the gathering the movement did not awaken any appreciable interest. It appeared to be felt that there was no need for a new language.

Medical Women at the Congress.

A hearty welcome was given to the medical women attending the Congress, to the number of about fifty. From within, general satisfaction was expressed at the manner in which the position of the ladies had been recognized. It is true that some slight difficulties had been created by the confusion resulting from the fact that the organization had not realized how the medical women would desire to receive social invitations, whether as ordinary members of the Congress, like the men, or as ladies, like those accompanying their male colleagues. But there was a sort of triumph visible in the faces of the nine "*Aerztinnen*" who were present at the *soirée* at the Royal Palace, to which no ladies in the ordinary acceptation of the term were invited. It was noticeable, however, that the "flunkies" regarded these medical women as "mere ladies," and insisted in handing them refreshments before the men were allowed to help themselves. The *Pester Lloyd* devoted a column and a half to a description of the achievements of some of these colleagues, and informed its readers that many of them were scientifically capable and much in earnest, with no loss of the attractive qualities of their sex. Several of them read papers in their Sections, notably on gynaecology, obstetrics, diseases of children, and hygiene. These communications were listened to with interest and frequently loudly applauded.

Social Democrats and the Congress.

The Social Democrats and the Congress came under one roof on Wednesday evening. A leaflet, taking the form of a special edition of the newspaper, *Népszava* (Voice of the People), was distributed on Sunday evening and Monday. In this a descriptive article of the position of the working man in Hungary was produced in three languages. While there is no doubt that exaggeration played a considerable part in this pamphlet, and the grievances as cited must be regarded as exceptional and to a certain extent temporary, there can be no doubt that the poorer population have much to complain of both in the town and in the country. The question of housing was dealt with in clamouring terms. The want of hygienic regulations, the failure to provide sufficient medical attendance for the poor, the consequent high death-rate and short duration of the average life, the oppression of the Parliament on the labourer, and the price of food are all subjects touched upon in violent language. In conclusion, the members of the Congress were invited to attend a public meeting on the Wednesday. At this meeting a number of the members attended, and considerable sympathy was shown to the cause. The speeches were delivered by a Hungarian organizer, a medical man speaking in German, and another Budapest Socialist in French. No vote was taken and no disturbance occurred.

Hygienic Conditions.

The state of affairs affecting the poorer population and the pauper classes is indeed far from satisfactory. It is true that much has been done during the past few years to mitigate some of the distress, but very much still remains to be done. There appear to be several determining factors which affect the life of the lower classes. In the first place, the population of Budapest has increased more rapidly than in any other town in Europe since 1801. In 1880 there were but few more than 370,000, while in 1909 the town counts nearly 1,000,000 inhabitants. The town of Pest is closely built in, no gardens surround the houses, and there is only one park of any size. There are squares, but chiefly in the area bordering on the Danube. Formerly the dwellings of the poor, miserable as these were, were scattered over the eastern side of the town. As the need for fresh houses and building land made itself felt, these hovels were pulled down, big houses which were to serve as dwellings for the upper and upper middle classes and for business premises, arose; the rentals were high and the poor were driven from pillar to post. Cellar dwellings, in which overcrowding and no drainage existed, had to become the asylums for these wretched people. Gradually the municipality realized the importance of this problem and barracks were erected, but in too few numbers. The rents were too high, and the labourer was compelled to take in lodgers into his already insufficient home. The result of men, women and children crowding together in one room, and in one bed, conduced neither to health nor to morals. However, the frequency of the overcrowded dwellings soon diminished, and that of the cellar dwellings also diminished rapidly. Within nineteen years the number of persons living in cellars has sunk from 31,637 to 8,083; during the last ten years the frequency of overcrowded dwellings has sunk by 2.4 per cent. of the whole population. The improvements in the housing of the poor depend on municipal enactments dating from 1885, which, however, were first enforced in 1892. According to these arrangements, no municipal rates are chargeable for fifteen years on labourers' dwellings, while lodging-houses, let to tenants in apartments of one or two rooms, are exempt for twenty years. After these periods have expired the rates are not to exceed 10 per cent. of the usual house-rates. Certain regulations with regard to hygienic conditions of dwellings point in the right direction, even if the terms are not comprehensive enough.

Another factor which contributes to the dissatisfaction is to be sought in the fact that, while certain laws exist for the protection of the classes, many of them are not enforced. Two striking instances of this laxness occurred within the past few weeks. On the Thursday preceding the Congress, as the writer was inspecting the St. Stephan Hospital, a number of boys and young men were admitted suffering from very extensive burns received in an explosion which took place at a cartridge factory. Of the 15 injured, 5 succumbed at once, and all the rest save one or two died within the next forty-eight hours. Although a law exists whereby it is made a penal offence to employ minors in dangerous trades, no notice is taken of this enactment, and the police do not trouble themselves to enforce it. The works manager in this case bears the reputation of a most humane and lenient employer of labour, but nevertheless boys and youths were daily set to handle the dangerous implements. One rule was in force which mitigates the state of affairs. A reward of a few fillers is paid for each defective cartridge which the girls employed in the packing house find and put aside. The result of the explosion was: eleven or twelve young lives wasted; a few crowns paid in compensation to the mourning relatives, and some sympathy; and a short spell of greater care to be exercised in the factory before the old state of affairs again

dominates. The second example was that of wholesale poisoning with impure rum. The law condemns the sale of adulterated or impure merchandise for human consumption, but no prosecutions are entered until a large number of lives are lost and much illness produced as a result of general poisoning.

In the third place, while lodging is dear, food is also very dear. The price of cereals is high; it has been gradually rising for the last few years. Meat is expensive, and cannot be indulged in by the poorer labourer; vegetables, but not potatoes, are almost prohibitive. Milk and other dairy produce on the other hand are cheap and excellent. The labourer cries out that his necessaries cost him too much. But it is at the same time true that during the past 15 years the price of labour has increased considerably. Formerly the wage of an agricultural labourer depended on the temper of his employer. Mostly he got a little food and no money; at times he received a few fillers irregularly. Now he commands a fair regular wage. Skilled trades command good wages. The factory hand does not earn much, but the mason, carpenter and bricklayer receive from 2s. 6d. a day upwards; 35s. a week is not uncommon, and in skilled work this sum is often exceeded. In this way, the working man is better off with dear food than he was with cheap food and low wages.

Lastly the reason for the demonstration mentioned above is to be sought in the fact that the Social Democratic party is just being formed, and is trying to make its influence felt in the face of disadvantages. The Ministry is considering the extension of the franchise—not to women, but to all the male population paying rates—but misgivings as to the intelligent exercise of the vote has caused the majority to hesitate before this principle is carried into effect. It would seem, however, that it is only a matter of time, before the class which now considers itself oppressed will receive some palliatives, even if these palliatives are not extensive in the course of a short time.

Besides the gatherings, meetings of societies, etc., mentioned, a number of other social and quasi-political events insinuated themselves into the large net of the Congress activity, and were duly accorded a place according to their face value.

CLOSING SESSION.

On Saturday, the 4th, at 10 o'clock, the members once again congregated in the handsome hall of the Municipal Town Hall (Redoute) to witness the closing scenes of the Congress. The numbers were considerably smaller than at the opening meeting, but, nevertheless, the hall wore a picturesque appearance. The Commission had met at 9 a.m., and the result of their deliberations was anxiously awaited by many interested in the formation of a permanent bureau. Shortly before 10 the officials and the other members of the Commission filed on to the platform, and in a brief space of time the President opened the proceedings. First, the reply telegrams of the King of Hungary and the King of Portugal were read. Next, the awards of the prizes were announced. With regard to the prize for the best work in ophthalmology on the etiology of trachoma, the jury had determined not to award the prize this time but to postpone it until the next congress. The Paris Prize was awarded to Professor Bordet, of Brussels (3,000 francs), while the Moscow Prize of the value of 5,000 francs was given to Professor Oscar Hartwig, of Berlin. The Lenval Prize for otology was given to Professor Gray, of Glasgow (to whom we offer our warmest congratulations) and Professor Neumann, of Vienna. Two new prizes were instituted—namely, one of 3,000 crowns for otology, offered by Professor Pollitzer, and the second, offered by Dr. Seaman, of New York, of 2,500 crowns for the best work on improvements in the service of the medical corps in warfare. The next business was the reading out, and adoption of, the resolutions of the Sections. The more important of these will be referred to subsequently when the proceedings of the Sections are dealt with.

The Next Congress.

It was then announced that the next Congress will be held in London. Dr. Pavy had been in communication with the Secretary of State for Foreign Affairs, Earl Grey, and had received from him a message toward the middle of the week to the effect that the Government approved of the suggestion that the next Congress should be held in England, and authorized him, Dr. Pavy, to invite the Congress to hold its next meeting in England in the name of the Government. This invitation was received with obvious approval, and a motion to send telegrams both to His Majesty King Edward and to Earl Grey, cordially accepting the invitation and expressing the hope that His Majesty would consent to become the Patron, was carried by acclamation. The next Congress, therefore, will be held in 1913, that is, in four years' time, although the British Medical Press Association had urged the proposal that a five years' interval would be advisable.

Permanent Bureau of the Congress.

The Commission next announced that a permanent bureau of the Medical Congress had been formed. The scheme put forward by the British Medical Press Association, which had been referred by the International Medical Press Congress to the Commission for consideration, as well as a less detailed scheme put forward through the Commission, had been considered, and a sort of compromise between the two had been accepted. As far as your correspondent has been able to gather details as to its composition, the bureau will consist of the presidents of the various national committees attending the Commission, one member of the International Medical Press Association (the President), and a permanent Secretary. A smaller working committee will be formed. Dr. Pavy was elected President, and the head quarters chosen are at The Hague. While the medical press only gains one direct representative, Professor Blondel, who is the General Secretary of the International Medical Press Association, has been elected Vice-President.

THE SPEECHES.

The PRESIDENT (Professor Müller) spoke a few words of regret that he had been robbed of the pleasure of filling his post during the earlier part of the Congress week, on account of sudden illness. He briefly reviewed the work of preparation and of the Congress itself, thanked those who had contributed to the success of the meeting and bade the members a hearty *au revoir* in London. Next followed the speeches of the national delegates. UHTHOFF, speaking in the name of Germany, referred to the part played by the ladies, then to the scientific importance of the lectures and interesting discussions and, lastly, to the important scientific contributions of the Hungarians. LAYER spoke for the United States, SIFTO for the Argentine, and POLLITZER for Austria. The last named stated that his expectations had been surpassed and that the organization of this Congress should serve as a pattern for future congresses. He made graceful reference to the splendid hospitality of the Hungarians, and especially of the Hungarian medical men. DE SOUSA spoke for Brazil, IVANOFF for Bulgaria, and SALAMONSEN for Denmark, the last named delighting the audience by stating that he would only say three words, "*Merci, adieu, au revoir!*" LANDOUZY, speaking for France, obtained an ovation; SIMENA for Spain was also well received. PAVY was received with a burst of cheers, and in clear tones made an excellent speech in English. Several other members followed, among whom Osawa (Japan), Wenckebach (Holland), Bourget (Switzerland), and Zoéros (Turkey) may be mentioned. Blondel, speaking as the representative of the medical press, closed this part of the programme.

The MAYOR (Dr. Bárezy) expressed his gratification at having been able to take some part in the successful meeting, by representing the town and receiving the members, who included the most celebrated medical scientists, in the municipal buildings. He was able to assure himself of the immense importance of the meeting for the public weal, and concluded by taking leave of the members in the name of the people of Budapest.

Count APPONYI rose, and stated that he had come to the closing session without having prepared a speech, trusting that some ideas might come to him from the speeches of the foreign delegates. The hope had been fulfilled when the delegate of Denmark had spoke his three words. "*Merci.*" He extended thanks to science, thanks to all the eminent men of the world of culture for the light which they had shed and for the warmth of their hearts, which

had left indelible impressions behind. "*Adieu.*" In wishing the members good-bye, he was able to express the hope that the advances recorded and the gain registered at the Budapest Congress would find an endless continuation in the development and endeavours of the medical world. "*Au revoir.*" Here he had some difficulty, for, as representative of the Hungarian Ministry, he would not even have the right to attend the next Congress. But, inasmuch as it is the duty of the Minister of Education to follow the advances in medical sciences, he felt that by knowing what the medical men in every country had done, and were doing, he would constantly be with the profession, and he was, therefore, justified in modifying the three words, "*Merci, adieu, et nous nous verrons toujours!*" The speech called forth loud and prolonged cheers. Finally, the PRESIDENT declared the Congress closed.

(To be continued.)

SCHOOL ATHLETICS AND BOYS' RACES.

WE have received from the Medical Officers of Schools Association a report of a discussion on *School Athletics and Boys' Races*,[1] a discussion which was evoked by the letter which appeared in the daily press last January signed by Sir Lauder Brunton, Sir Thomas Barlow, Dr. James Goodhart, Dr. Hale White, and Sir Alfred Fripp. The following review of this discussion should be read in connexion with the papers on the medical aspect of athleticism read at Belfast and published elsewhere in the present issue. The signatories of this letter stated that they considered "school and cross-country races exceeding one mile in distance wholly unsuitable for boys under the age of nineteen, as the continued strain involved is apt to cause permanent injury to the heart and other organs." Dr. William Collier, of Oxford, opened the discussion, and after expressing regret that the letter was ever written pointed out that "it was likely to weaken the confidence parents should have in the medical officers of our schools." He asked "Why did the signatories wait for a prominent football player to get this information out of them?" Sir Lauder Brunton a year and a half ago was president of the International Congress on School Hygiene. Sir Thomas Barlow and Dr. Goodhart had both been presidents of the association, an association established for the express purpose of discussing everything connected with the health of the schoolboy. "Surely they might have suggested the subject for discussion if they had been so much impressed with the dangers of long-distance running." Forty-two years ago Mr. Skey, a then well-known London surgeon, raised an outcry against the university boat race, and asserted that many a constitution was ruined by that race. Dr. Morgan of Manchester carried out an exhaustive inquiry into the after-health of competitors, and proved that the number of men injured by the boat race was very small indeed. Even in this small number the proof of injury by racing was far from convincing. Drs. Blake and Larrabee, between 1900 and 1903, carried out a set of observations on Marathon runners in Boston, and reported that:

> The Marathon races of the past five years prove that it is entirely possible to train considerable numbers of picked young men to develop speed far beyond anything obtained in modern armies.
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> Mobility of armed forces is admitted to be of the first importance.
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> If we consider the speed at which the winners ran, the character of the roads, the frequency of hills, and the oppressive atmospheric conditions, it seems marvellous that the human body can be trained to withstand so much with so comparatively little depression. The unpleasant results of longest duration seems to have been blisters on the soles of the feet. In the entire three years we neither saw nor heard of any serious persistent after-effects, and it has yet to be proven that even strenuous contests leave behind them a permanent injury.

These authors, just as Dr. Collier and Sir Clifford Allbutt, rightly describe the hypertrophy of the heart which is found in the athlete as a physiological reaction, natural and beneficent, just as are the enlarged biceps of the blacksmith. In six out of eighteen of the Marathon runners systolic murmurs were audible over the heart just before the race at the starting post. These murmurs were attributed to disturbed action under nervous excitement, as athletes examined by Williams and Arnold in 1899 some days before a Marathon race had none. In several systolic murmurs were audible after the race; their capricious occurrence, variable locations, and fugitive characters suggested that no one cause accounted for them all. Three were cardio-respiratory, ceasing on holding the breath, and three apical systolic murmurs. Sphygmographic records signified a great fall in blood pressure and dicrotism, facts confirmed by the recent sphygmometric observations of Drs. Hill and Flack on boxers. Blood counts showed an increase of polymorphonuclear and large mononuclear capsules. The body temperature in most rose, in some even to 104.4° F., just as Drs. Hill and Flack have observed temperatures of 104° and 105° F. in English athletes after a three-mile race. This is a physiological reaction. The urine in every case showed the presence of albumen, which lasted some thirty-six hours, there were very many hyaline and granular casts, with a little blood in the sediment. Dr. Collier says that in the past he has advised many an athlete to give up because he found a cloud of albumen after exercise. He now advises nothing of the kind, for, after systematic observation of 156 specimens of Oxford undergraduates, 130 showed a cloud of albumen, while, of 38 boys after racing, 37 showed traces. How many men must have been warned off healthy and enjoyable exercise by the finding of albumen, which cannot be considered otherwise than a physiological phenomenon after severe muscular exertion! The wearing off of a little kidney substance is of no greater import than the wearing off of the skin of the soles of the feet. Repair puts both skin and kidney right.

At the two universities some 1,800 men enter each year most of whom come from public schools, and many of them in the first year pass under medical inspection. The opinions of the medical men at Oxford and Cambridge, including the evidence given by Sir Clifford Allbutt, is that damage to heart and lungs caused by over-exertion in school races and other forms of school athletic exercises is extremely rare. Sir Clifford Allbutt said that:

> For thirty-five years he has been watching for cases of injury to the heart done by boys simple and solely by over-exertion at some game. He did not say he had not seen any harm at the university, but it was strange that when he had so many medical friends all over England who had sent their boys up saying they wished him to look them over, he had never seen an instance in which he had reason to suppose that any particular harm had been done by exercises.
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> When undergraduates got overstrain of their hearts through exercise there was nearly always a previous infection.
>
> The young and healthy heart was so resilient that it was, he believed, impossible for any harm to be done to it by any effort which the boy's own muscles were able to entail upon it. He did not see any permanent harm in these cases where school races were indulged in, unless the boys were untrained or there had been some previous infection.

These opinions were confirmed by Dr. Armstrong of Wellington College. Some 3,000 boys had passed through his hands in twenty-five years, and nothing but good had come out of the sports, properly regulated. He had circularized the long-distance runners among the old boys of the last twenty years, and had received over fifty replies stating that nothing but good had come from their having taken part in cross-country races. Dr. Robert Michell said that, as far as his experience went at Cambridge, it was a very rare occurrence for a healthy man to do himself any harm while training for or taking part in an athletic contest. This opinion he based on the facts obtained by overhauling a comparatively large number of undergraduates when healthy as well as when ill.

Out of 38 school medical officers 29 do not know of any case of permanent after-damage from athletics: 9 mention instances in which they believe harm has resulted from house runs, rowing, gymnastics, or where boys have been allowed to take part in the above without previous medical examination. In these cases we require the careful elimination of cases, whereof infection, undetected heart lesions, etc., before we can ascribe any importance to them in the face of the overwhelming negative evidence of the 29 and the "Varsity" practitioners. Neither Sir Lauder Brunton nor Dr. Goodhart, who spoke at the meeting, instanced any cases of permanent harm which had come under their review. Certain resolutions were submitted

[1] *School Athletics and Boys' Races.* By William Collier. Issued by the Medical Officers of Schools Association. London: J. and A. Churchill. 1909. (Demy 8vo, pp. 32. 1s.)

to and approved by the meeting, the more important of which insisted on—thorough medical examination of every boy on entering school; observation of effects of games on young and new boys; interval of one hour at least between the previous meal and active exercise (to neglect of this simple rule is attributed the cause of most of the evils attributed to over-exertion); caution in resumption of games after convalescence from diphtheria, influenza and influenzal catarrhs, rheumatism and measles; caution during a period of rapid growth; grouping of boys of like strength for runs suited to their strength. Games and athletic exercises are absolutely necessary to ensure proper development, to prevent loafing and immorality. The discipline of games is of the highest value in training and developing both body and mind, certainly of no less value than that of school work. The point for attack, we believe, is not the indulgence of boys in games, but the pernicious habit of making the boys who should all be playing watch the school eleven or fifteen, and loaf or shiver round the playing fields on a half-holiday.

LITERARY NOTES.

AMONG the autumn announcements of the Oxford University Press is a new edition of Sir Thomas Browne's *Religio Medici*, with Sir Kenelm Digby's observations thereupon. The volume forms a part of the Tudor and Stuart Library. From the same press will issue the following volumes of the new translation of Aristotle's works appearing under the editorship of Messrs. J. A. Smith and W. D. Ross: *Historia Animalium*, by D'Arcy W. Thompson; and *De Mirabilibus Auscultationibus*, by L. D. Dowdall.

Messrs. J. and A. Churchill's *Illustrated Catalogue* for October, 1909, may be commended to all intending purchasers of books dealing with medicine and science. It is well arranged for easy reference. The books are classified under thirty-four heads, and many specimen illustrations are given. A glance at the Index to Authors shows the important nature of the works published by this well-known firm.

Messrs. Rebman, Limited, will publish about October 1st a romance entitled *The Prince of Destiny*, by Sarth Kumar Ghosh, which is described as presenting a picture of Indian life from the inside, with its social customs and moral ideals, its eternal patience, its religious fervour, its passionate love. The book is also said to reveal the Indian view of the causes of the present unrest, and Britain's unseen peril in India.

In *Old Etruria and Modern Tuscany*, by May Lovett Cameron, recently published by Methuen, it is stated that in regard to scientific knowledge the Etruscans were at least the equals of their contemporaries. They had an extremely accurate method of determining time, which, strangely enough, was also known to the Mexicans. Long periods were measured exactly by astronomical calculations and formed the basis of their calendar. Surgical instruments have been found which show that in the knowledge of anatomy and of the methods of treating disease they had anticipated some of the latest discoveries of our own times. Dentistry was also practised, as is shown by the gold settings of the false teeth in a skull from Falerii in the Papa Giulio Museum at Rome, and in the complete set of teeth found at Corneto.

In Messrs. Methuen's *Illustrated List of Announcements of Forthcoming Books for the Second Half of the Year 1909* we find the two following books dealing with medicine: *Air and Health*, by Ronald C. Macfie, M.A., M.B., and *The Hygiene of School Life*, by Dr. Ralph H. Crowley, late Medical Superintendent Bradford Education Committee. The physical condition of the child is dealt with, stress being laid upon the defects and diseases which have more especial connexion with school life. Medical inspection in its newer aspects is fully considered, and particular attention is paid to the more important of the special groups of school children, such as the feeble-minded, epileptic, blind and deaf, crippled, etc. A chapter is devoted to the treatment of defects and diseases, and particular attention is given to the more recent developments of school hygiene, such as the provision of meals to school children, the provision of school baths, physical exercises, the open-air school, the school clinic, etc. Two chapters are given to the infectious diseases connected with school life. In regard to the surroundings of the child, school planning and the problems of ventilation are dealt with in one chapter, and in another the general equipment of the school building.

We have received from the Editor of the *Medical Officer* a bound and indexed volume of the special issues of that journal which appeared daily as the official journal of the recent Leeds Health Congress. The price is 2s. post free, net, and those who may wish to possess this valuable record can procure it from the publisher of the *Medical Officer*, 36–38, Whitefriars Street, E.C.

The Edinburgh Parsi Union has issued a booklet *In Memoriam* of Dr. Cawas Lalcaca, who was murdered at the London Imperial Institute when attempting to save the life of Sir Curzon Wyllie on July 1st. It gives an account of his life and of the tragedy which ended it, together with the numerous tributes to his character which appeared in the newspapers at the time. The booklet, which is justly described on the cover as "the record of a brave deed," can be obtained from the Edinburgh Parsi Union, 38, Chalmers Street, Edinburgh. The entire profit of its sale will be devoted to the perpetuation in some suitable form of the memory of Dr. Lalcaca.

In the *Recollections of a Long Life*, by Lord Broughton, Byron's friend, recently published by Mr. John Murray, there is the following entry among the chronicles of 1814:

> Miss Bayley told me to-day that Mr. Phipps, the oculist, told a gentleman, who told her, the following anecdote of the late Duchess of Devonshire. Mr. Phipps was sent for to Chatsworth to operate upon the duchess's eye. He stayed there some time, and at parting received from the duke a fee of £1,000. Just before he stepped into his carriage a message from the duchess brought him to her chamber. She hoped the duke had done what was handsome by Mr. Phipps. The gentleman protested, "Yes, and more than handsome." "It is an awkward thing," continued Her Grace, "to ask, but really I am *at this moment* in immediate want of such a sum, and if you *could*, Mr. Phipps." What could the oculist do? He produced his £1,000, took his leave, and has never heard of his money from that day to this.

This is about as impudent a way of swindling the surgeon out of his fee as we have come across. And the duchess had not even the excuse of a hen-roost-robbing Budget to plead in palliation of her meanness!

In the *Book of the Chronicles of Keith, etc.*, by the Rev. J. F. S. Gordon, D.D., printed at Glasgow in 1880, there is a curious account of an old medical worthy of that northern town, written by James Henry, a local watchmaker, in 1832. Dr. William Douglas, who died some thirty years before that date, was celebrated for his humanity and professional skill, and also for his eccentricities. After completing his studies he intended to go to India, but was accidentally detained by a summons to attend a patient in Keith. One patient brought another, and the number increased to so encouraging an extent that he determined to fix his abode among people so appreciative of his merits. He gained a great reputation, and patients came to him from distant parts. He took care to keep himself abreast of the medical science of his time, and collected a large library. He was deservedly held in universal respect for his learning and integrity, but his eccentricities doubtless helped to keep his memory living among the people of Keith long after his death. He was a man of herculean frame with strongly marked features. His costume was that of the old Scottish fashion: he wore a large "Tie-Wig" and carried a gold-headed cane of bamboo. Of the stories told of him only a few examples can be given. A purse-proud matron who had occasion for his services took care to remind him that she was the "Guidwife o' Boat o' Brig," but to this the doctor merely answered, "Aye, aye," adding "an' ye're the Guidwife o' Boat o' Brig?" The lady on asking his fee was somewhat taken aback by its amount. Immediately after her departure some humbler patients were attended to; and, on their anxiously inquiring what they had to pay, they were informed that "the Guidwife o' Boat o' Brig had settled their account"! Another guidwife asked the doctor about her eyesight: "I wunner fat maks my een so weak in the mornins?" Quick and sharp came the reply: "Just, guidwife, because they are in a weak place." On another occasion the doctor was called to see a sick lad, and prescribed syrup of buckthorn or *Ramus catharticus*, writing it, according to the customary abbreviation,

"R. Syr. Ram. Cat." Soon afterwards the mother came and upbraided him for trying to "mak' ony ane tak' *seerup o' Ram's Guts.*" The answer was racy if somewhat rough: "Faugh, Bach, Ach! Ye bullheaded fat SOO! Gae hame wi' ye, and gar yer loon take the *Recipe*, neither frae a Ram nor Tam cat,—but *Seerup o' Buckthorn.* Ha, ha, ha! The muckle Wife yellin' aboot *seerup o' Rams and Tam Cats.* Lord preserve us!—that beats cockfechtin'." To another woman the doctor remarked: "Weel, I see ye're progressin'. The minister has been catecheezin' in yere barn last ook." "Oo, aye; speerin' and speerin'; he speert fat I was compos'd o'." "Fat said ye to that?" "*I said that we wer' a' fearfully and wunnerfu' made.*" "Faugh! tell him fan he speers at you again—that an umman is composed o' twa hunner an' forty-three banes, a hunner and saxty-nine muscles, an' three hunner an' saxty-nine *Pins;* faith ye'll blek the minister: tell him to back speer ye there." "Doctor," said another dame, "examine my tongue an' tell me what it needs." "It needs rest," was the doubtless appropriate reply.

CERTAIN BIOLOGICAL PHENOMENA IN CONNEXION WITH CANCER.

OVER and over again we have uttered a word of warning against far-reaching deductions from experiments in connexion with malignant disease. As a rule, as soon as an observer comes across a new phenomenon or a new variation of an old one, theories are built up and a plan of treatment is evolved which is described as the long-sought cure for cancer. Each new observation contributes to the fund of knowledge, which in time must inevitably lead to the clear understanding of the pathology and etiology of cancer. Our warning is merely directed against premature interpretation of stray facts, and building up a house on the foundation of a single brick.

Professor Spiro Livierato, working apparently under Professor Maragliano,[1] has sought for a means of diagnosing gastric cancer, and has found that the gastric secretion in cases of cancer of the stomach together with an extract of a neoplasm is capable of inhibiting the solution of blood corpuscles in a haemolytic system. He speaks of antigen in this case, but in order to keep an open mind and not to confuse the issues it will be better at present to name his reagents according to their origin, and not according to what they are supposed to be. The reaction is carried out as follows:

Gastric fluid is obtained from the cancer patient as usual, filtered under pressure aseptically, neutralized with 10 per cent. caustic soda, and heated for one hour to 60° C., and then preserved in the cold.

The extracts are prepared by grinding up mammary carcinoma or sarcoma of the skin with sterile glass fragments in sterile physiological saline solution. A few drops of chloroform are added; the mixture is then placed for twenty-four hours in the incubator and filtered through a sterile paper filter, after which it is placed in tubes and kept in the cold room.

One-tenth of a cubic centimetre of normal guinea-pig's serum (containing complement), from 1 to 1½ c.cm. of gastric juice, prepared as above, and 1 or 1½ c.cm. of the cancer extract are placed in test tubes. After shaking, the tubes are allowed to stand at room temperature for four hours, and then the haemolytic mixture, consisting of 0.2 c.cm. of the serum of a rabbit previously treated with ox blood corpuscles and 0.8 c.cm. of an emulsion of ox blood corpuscles in physiological salt solution, is added.

Of 8 cases of cancer of the stomach tested in this manner, the inhibition was complete in 7, while in 1 only traces of solution of the blood cells were seen. On testing the gastric juice of healthy persons or of those suffering from affections other than cancer, haemolysis took place in each case. Six such gastric juices were examined. Professor Livierato records these facts, and states that up to the present it is not easy to explain them. He believes that the inhibition cannot be the result of mere accident.

In recording these experiments, it seems to be necessary to consider what the reagents contain, in order that when these investigations are repeated by others and extended, it may be seen in what respects such phenomena are parallel with other forms of inhibition of haemolysis. As far as the haemolytic system is concerned, the constituents are identical with those used for other purposes. It will be remembered that Ehrlich and Morgenroth described the process of haemolysis as the action of complement, present in normal serum but destroyed by heating to 56° C., on blood cells through the intermediation of a specific amboceptor, which is produced as a reaction-product by the injection of blood cells into an animal of another species. The complement can act only in the presence of this amboceptor. Wassermann, Bruck, and Neisser, in describing complement deflection in connexion with syphilis, state that when the serum of a syphilitic patient and an extract of a syphilitic organ were mixed with the haemolytic system, the complement was deflected from the amboceptor, and no solution of the blood cells took place. Later investigations showed that the extract of the liver of the syphilitic infant could be replaced by other fluids, and it therefore became doubtful whether Wassermann's interpretation that the extract acted as an antigen—that is, the substance causing the production of the antibody—could be accepted. If the antigen theory were true, it would mean that that portion of the poison of the virus which produces an antibody in the organism, joined chemically to the antibody, forms a compound which has a greater affinity for complement than the specific amboceptor has. But, even if the antigen theory is not accepted, it can still be said that the antibody produced as a reaction product by a disease poison together with another chemical substance forms a compound which combines with the complement with avidity.

To return to the gastric juice, it seems that after neutralization with caustic soda and heating, both the free acid and the pepsin and rennet as such must be destroyed. The juice would then no longer be a digestive substance, but must contain a number of constituents of which we have no knowledge. If the substitution of the gastric juice of normal persons for the cancerous gastric juice is not followed by the same inhibition, then it is clear that this juice must contain something which the normal gastric juice does not contain. The fact that it combined with the extract of a malignant tumour need not mean much. That the abnormal constituent is not likely to be a simple compound, like sodium lactate, is evident from the knowledge obtained as to other forms of haemolysis inhibition. Other products of partly disintegrated proteid, however, might take a part in the reaction, and it is therefore necessary for the biologist to ascertain whether the reaction is truly specific for the gastric juice of patients suffering from cancer of the stomach; whether the extract can be replaced by other substances; whether the reaction is influenced by the type of gastric juice, including the pepsin and acid content before treatment; and whether other fluids of the body have a similar action. These and many questions need investigation before the diagnostic significance of the reaction can be established.

[1] *Berl. klin. Woch.*, vol. i, No. 17, 1909.

LUNACY IN EGYPT.

IN the summary of the annual report for 1907 of Dr. John M. Warnock, the Director of the Government Hospital for the Insane at Abbassia, near Cairo, published last year, allusion was made to the fact that, although the asylum accommodation had that year been raised to 877, there was already at the end of the year an excess of 19 patients over accommodation. The report for 1908,[1] recently received, shows that at the end of that year the patients had increased to 1,017, an excess of 140 over the provided accommodation. Actually there was an excess of 161 in the male wards and 21 vacancies in the female wards. Owing to want of accommodation numbers of insane are discharged. Care is taken to select the most peaceably disposed, but, notwithstanding this, the results, Dr. Warnock says, are often disastrous. Of this he gives a few examples: Two committed suicide two months and another four months after discharge; one killed his wife a fortnight, and another committed murder a month, after discharge, and another broke his father's ribs in the same month in which he was discharged. The written promises made by the relatives to take care of these discharged patients have been found to be worthless. Both lunacy organization and lunacy legislation in Egypt

[1] Fourteenth Annual Report of the Egyptian Government Hospital for the Insane. For the year 1908. Cairo: National Printing Department. 1909.

appear to be very defective, and the regulations which exist are frequently contravened. Certificates have to be returned for the correction of glaring mistakes; foreigners are occasionally admitted without consular order, and many of the ordinary certificates are found to be worthless as evidence of insanity. Dr. Warnock says that in some cases it takes months to get the certificates corrected, after prolonged correspondence, and that by the time this has been done the patient, on several occasions, has died or been discharged. Many patients are brought to the asylum without certificates, and the responsibility of admitting or rejecting is left with the director. Some of the rejected cases have returned home and there committed crimes. These are only some of the difficulties which Dr. Warnock encounters, and we hope that he will soon be able to secure the reforms for which he is pressing.

Statistics.

On January 1st, 1908, there were 896 patients in the asylum, and on December 31st there were 1,017. The total number treated during the year was 1,489, and the average number daily resident 952. During the year 593 were admitted, of whom 472 were first and 121 not-first admissions. Of these 27 were admitted severely ill or injured, most of whom were not in a fit state for removal. Eleven were already moribund from illness or injury, and the remaining 16, with the exception of 3 who had enteric fever or severe diarrhoea, had either broken bones or cut throats. Of the total admissions 335 were dangerous and 197 suicidal. The admissions were classified according to the forms of mental disorder as follows: Mania 130, melancholia 37, chronic mania and dementia 66, pellagrous insanity 88, insanity from hasheesh 36, insanity from alcohol 35, general paralysis 33, adolescent insanity 31, weak-mindedness 25, epileptic insanity 21, senile insanity 19, imbecility and idiocy 17, puerperal insanity 6, post-febrile insanity 5, paranoia 4, traumatic insanity 3, organic dementia and morphinomania 1 each, and not insane 12. The large number of cases of pellagrous insanity and hasheesh insanity, the small proportion of cases of melancholia, and the fact that the general paralytics (nearly 6½ per cent. of the male patients admitted) form about the same proportion of the admissions as in England and Wales are worthy of note, more particularly because it has been stated on more than one occasion, and that recently, that in Mohammedan countries where syphilis is rife, general paralysis is rare.

With regard to causation, the relative importance of hasheesh, alcohol, pellagra, epilepsy, congenital defect, old age, the puerperium and injury has been given above. To these, however, may be added syphilis in 25 and mental and moral stress in 29. Dr. Dudgeon, Subdirector, reports that 24 of the 33 general paralytics, or 75.7 per cent., had symptoms or gave histories of former syphilitic infection. Also 29 of these were men and 4 women, and most of them dwellers in towns.

The results of an interesting investigation by Dr. Dudgeon into the atoxyl treatment of pellagra is contained in the report. Atoxyl was given hypodermically in 158 cases, each case being injected six times, extending over one month, so that each received 1 gram of pure atoxyl. Other cases, in which the treatment was stopped before reaching the above dosage for various reasons, are not included in his figures. Of the total 158, 93 did not improve; and 65, or 41.1 per cent., did improve; whereas, of 216 cases of pellagra of the 1907–8 admissions not treated with atoxyl, 101, or 46.7 per cent., improved. These results, therefore, do not confirm the Roumanian observations quoted in last year's report, but show that the value of atoxyl, in the treatment of advanced stages of pellagra at any rate, such as are met with in this asylum, has not been demonstrated.

Discharges and Death.

During the year 85 were discharged as recovered, giving a recovery-rate on the total admissions of 14.3 per cent.; 216 as relieved, 50 as not improved, and 14 as not insane. During the year also 107 died, giving a death-rate on the average numbers resident of 11.2 per cent. The deaths were due in 44 cases to cerebro-spinal diseases, including 22 deaths from general paralysis; in 19 to chest diseases; in 16 to abdominal diseases, including 10 deaths from dysentery and diarrhoea; in 2 to the results of violence; and in the remainder to general diseases, including 10 deaths from tuberculosis, 8 from pellagra, and 3 from bilharzia disease. Serious but non-fatal accidents were numerous, 15 involving fractures of bones. Mechanical restraint by means of camisole was used for a total of 4,946 hours, and the amount of seclusion remained high on account of the number of homicidal criminals detained at this asylum.

PERSONAL EXPERIENCES ON EMIGRANT SHIPS.

[FROM A CORRESPONDENT.]

"SAY not thou, 'The former times were better than these,' for thou dost not enquire wisely concerning this." The preacher might have uttered a converse word of as much wisdom; "Say not thou, 'The former times were much worse than these.'" The fact that conditions on emigrant ships are much improved compared with what they were fifty or even twenty years ago, does not mean that they are as yet anything like what they should be.

It has been the present writer's lot to travel in various capacities and various classes on emigrant and other boats. The personal experiences of a medical practitioner, not the paid servant of a steamship company, may be useful, particularly when it is considered that the bulk of emigrants are usually rather ignorant people, who have little idea how to ventilate their wrongs. In any case, steamer grievances are apt to be forgotten in the stress and strain of a start in a new country. It is only the thoughtful observer who realizes the possibly lasting consequences of bad hygienic conditions.

The longer the journey and the worse the climatic conditions, the more serious are the consequences. For this reason, Australian and New Zealand emigrant ships should be most carefully regulated. On the whole, I have come to the conclusion that British ships are better regulated as regards actual safety of the vessels and proportion of air and floor space per passenger, while voyages on an Italian, a German, and an English emigrant ship in succession made me conclude that there is not much to choose between them in quality of rations, though the quantity seemed on the whole more liberal on the German boat.

The great grievance on all boats (except, of course, first-class on the Atlantic fliers and by the Anglo-Indian liners) is the cooking. No doubt ventilation, sanitation, and cooking are all rendered much more difficult by shipboard conditions, but British lines have done much in the first two matters and are being closely followed by other flags, and surely the last word has not been said on the third. Board of Trade regulations in the case of ships clearing from British ports, and competition in the case of foreign ships, insist on inspection (usually medical) of the quality of a ship's stores, and the scale of food per passenger is usually posted in conspicuous places or put on the reverse of the ticket. Most companies, in the highly-coloured pamphlets they issue to attract passengers, add that, on the recommendation of the ship's doctor, special diet is given to women, children, and invalids.

What is needed, however, is inspection during the voyage, and this not by the ship's doctor, who is in a hard position between the Scylla of his duty to his profession and his patients and the Charybdis of his obligations to his employers. Only on an Italian Atlantic steamer have I met a doctor specially appointed by Government to the charge of emigrants, besides the ordinary ship's surgeon. Such an inspector, naturally a medical practitioner, might well be carried during the emigrant season by every boat taking more than, say, 100 third-class passengers. It should be his duty to inspect the passengers on sailing and on arrival and at weekly intervals, the women and children, say, twice a week. This would prevent such scandals as the use of public baths and wash-houses by persons with scabies and impetigo, if not actually with venereal skin lesions, till at last the infection of clean and healthy persons, or the nervousness of decent passengers, calls the attention of the ship's doctor to the matter.

Any one who has witnessed the embarkation at Syrian ports of passengers, many of them children, some perfectly healthy, others in all stages of ophthalmia from granular

to purulent, is struck by the folly of exposing the healthy to the imminent risk of contamination. Unfortunately the Oriental is the worst sufferer from ophthalmia, and his characteristic wiliness often supplements his defective physical sight organs. The Syrian, on his way to his El Dorado, America, changes ships at Marseilles; the Levantine, to avoid a ticket with the suspicious superscription of "Port Said," takes a cheap deck passage from Alexandria to Naples, and there, posing as an Italian, catches a big Australian liner. It can hardly be expected that all colonial immigration officers shall be conversant with Arabic, and so weakly Orientals of the lowest classes land in the new countries, to spread the diseases and, one must add, the habits of the worst part of the East. A medical inspection would prevent women in the first stages of septicaemia from self-procured abortion from remaining in stuffy cabins, a danger to themselves and every one else. The presence of a Government official would also prevent the treatment of fractures in parts of the ship subject to the maximum of movement.

One of the duties of the Government inspector should be to attend the third-class meals, actually tasting the dishes provided. I have known potatoes left wholesale by hungry men because absolutely unpalatable for lack of salt, and beef-tea served to children so salt that their ulcerated mouths forbade their taking it. I have seen roast pork and apple dumpling served as a Sunday dinner on the day we crossed the line, and have not marvelled at the hard run on patent pills during the next twenty-four hours, nor at the number of quarrels even ending in blows. I have seen good condensed milk so diluted as to be merely opalescent water, but the only nourishment children under a year could get, and on going on deck after meals have seen buckets of this thrown overboard. Allowing one tin of milk to each bucket, it would surely have been better to use it to improve the quality of the babies' milk than to throw several tins daily overboard.

The inspector I dream of could remedy all this, and with no extra expense to the company. It may be said that mothers and sick people can apply to the doctor; they are sometimes too ignorant, sometimes too long-suffering to do so, until serious mischief has resulted. The ship's doctor is often in a very unsatisfactory position; he can only *recommend* alterations to the purser, and his own life would often be unendurable were his recommendations to become even troublesome, and still more if expensive. Moreover, he has his duties to officers and crew, and to passengers of other classes. His tenure of office is often limited to one voyage, and he is very frequently a young man with little knowledge of how to get things done with least friction. Lastly, in my view (perhaps Utopian), an emigration inspector would promote ventilation, sanitation, and cleanliness. The presence of persons from Eastern and Southern Europe, from Egypt and the Levant, as well as from Indian ports, is usually signalized at once by the state of the lavatories. The cleanest lavatories I have seen were on the Italian ship referred to, where the authorities were evidently apprised of the squatting attitude adopted by the races above mentioned in defaecation. There were no seats, but a marble platform with a central hole, rests for the feet, and supports for the hands, and a gentle flow of water was secured over the platform. Another very clean idea I found in a port of the Mediterranean—a watercloset with a horseshoe seat, the portion which would fall under the pubes being omitted. The next cleanest boat I have observed was one of the North German Lloyd, where special lavatories were told off for "Italians"—a generic term for all dark-hued persons getting on at Naples, and, as I have said before, usually hailing from North Africa, Egypt, and Syria. In all the lavatories there was a flush of water every minute from an automatic tank. The hospital bath was reserved for children every afternoon, and a stewardess was in attendance, thereby reducing the spread of contagious and infectious disease through ignorance to a minimum. Ample accommodation was provided for third-class passengers wishing to wash their linen, and a Chinese laundry on the boat washed for those able to pay.

Finally, a Government official actually travelling with the boat would be far better able to judge than one in a port of the actual working of the arrangements *while at sea*. I have seen staircases so dangerous that on an American run the ships concerned would have advertised "carry men only," and yet women travelling alone to join their husbands and usually encumbered with infants had to haul themselves up and down as best they could, in storm or calm. There is a tendency to forget that, though perhaps the majority of emigrants still consists of lads and men of active habits, there is now an increasing proportion of women and children, and even of old men and cripples, going out to join relatives who have already made their start on the land. There is an increasing proportion also of people of the respectable, and even of the educated, classes, who cannot afford even second-class rates on a long voyage, but suffer intensely from such avoidable evils as I have alluded to. The restaurant system, with a library attached, to which admission could be gained by a small fee, and the provision of a lavatory worked on the "penny in the slot" principle, and looked after by an attendant, would be a great boon to occasional third-class travellers.

Nova et Vetera.

DOCTOR AND PATIENT IN 1775–6.

OUR nomadic modern habit of living in a hired house for the term of a short lease and then flitting to another, coupled with a certain contempt, inherited from utilitarian mid-Victorian forbears, for everything belonging to the ages previous to our own, is an influence entirely hostile to the preservation of old prescriptions, and those kindred *obiter scripta* which are so dear to the heart of the medical antiquarian. We have known the modern suburban leaseholder to tear up everything left behind in writing by "dear papa," lately deceased, on the ground that the latter, being a very learned man, left a great litter of papers behind him, of which it was a pleasure to rid the house at the earliest opportunity. Of course, some confidential matter is thus rightly destroyed, but much is denied to posterity which the latter has a right to be shown. If eighteenth or early nineteenth century trivialities of a medical kind, or, indeed, of any kind, have by any chance survived to our own days, we may be sure that they have owed their preservation to mere chance in the first few years of their existence. After these first few years, perhaps they have survived for other reasons—because they look old and faded, or merely quaint. It is the first decade of the existence of a trivial old document which decides its fate.

We have lying before us a quaint correspondence between doctor and patient, or, rather, the letters of a doctor to his patient and to his patient's other medical adviser, which owe their continued existence to the accident of their having been forgotten in a dower or muniment chest, which for generations stood secluded in the laundry of an ancient house in Shropshire. It was probably nobody's business to destroy these papers, which were put away in the first instance by an anxious invalid of the kind that sets great store by medical instructions, even when he neglects them.

It is not of course a very important correspondence. John Hunter or Sir Astley are not advising a great statesman as to how to preserve his health. On the contrary, an unknown Worcester physician, a certain Dr. William Thomson, is advising, as doctors in every age have been compelled to do, a self-indulgent and apparently not too candid patient (a Mr. Walker, whose house has vanished, like that of Tennyson's Aylmers) how to combat a disease caused in some measure by alcoholism and indolence, as well as by a radically wrong diet. The letters are very conscientiously written, if we bear in mind the fact that Dr. Thomson is indebted to Mr. Walker, the Squire, for sundry guineas and presents, which would be enough in themselves to silence the voice of righteous protest in ears less sycophantic than were found in the eighteenth century.

The Squire appears to have been what was called a scorbutic subject, and his correspondent writes to a Ludlow surgeon as a preliminary to addressing the patient himself. It is a sensible letter, a fair specimen, probably, of the correspondence of medical men in 1775. The object to be aimed at is that the sufferer should "clear any of his bowels that may have been obstructed." The use of water impregnated with "the neutral salts" is advised, as also "moderate and long-continued exercise on horseback."

"Were he to come every morning from Fernyhall to Saltmore, and drink two or three pints of that water, and then ride back to dinner, I think he would soon find the good effects of it, especially if he were to wash his legs with the same water three or four times in the day, which might easily be contrived, if his servant will carry home a quart bottle of it every day."

The idea that two pints of water are enough for a foot-bath, that will be taken several times daily, is surely characteristic of the eighteenth century, that little-washing age, which has handed on to us the smallest washstands of Chippendale design it is possible to imagine. There follow some curious notions on the subject of sea-bathing, then in its early infancy. "I agree with you that the sea water would probably be quicker in its effect, if he were to go to the seaside and drink as much of the water as would purge him 4 or 5 times every morning, and at the same bathe in the sea every day, or every other day, and besides that, wash his legs frequently through the day with the sea water."

A prescription, not preserved, seems to have accompanied the letter, but it must have been voluminous, to judge by others that remain. "During the use of the prescription he should use a cold bath every 3rd morning." This, of course, reminds us that the daily cold tub is quite a modern fad, introduced into England from India by retired army men as late as 1845, or thereabouts. When we say England we mean expressly to exclude Scotland, for a friend, whose memories reach far back, reminds us that, in the Fifties, he heard an old lady north of the Tweed addressing her military guests overnight in some such words as these: "And ye'll no require cauld baths in the morning, or any o' that nonsense!"

A second letter, dated June 14th, 1775, expresses sorrow that the Squire labours under a difficulty of breathing. "But as you say it is temporary, and only affects him in a morning, and as you do not mention any constant and troublesome cough, I flatter myself there is no obstruction in the chest, and that the whole is scorbutic. The decoction of the bark with Oxym. Scill. is a good medicine upon either supposition, and I would wish to have it tried; but if it does not remove the complaint, I would recommend the following." The prescription, owing to old abbreviations, is beyond present day deciphering, but it contains quinine and opium. "I must, however, again recommend it to him to rely greatly on his horse, whom he will find the best Doctor among us. If he would take a little round in some of his neighbouring counties, and thereby vary the air and the scene, he would find his account in it."

Here, then, we have the beginnings of the tour in search of health, which is not as modern as some suppose.

The three letters in this small collection which are addressed to the Squire himself, are couched in terms of great respect. "Before I prescribe for you," says the writer, "I must beg leave to enquire a little about this frequent making of water in a morning after drinking your chocolate. Is it discoloured?" and so forth. The patient of course is the last person who can give accurate particulars as to himself, and we find him with a tippler's subtlety suggesting that he should drink a particular water; for his adviser commends the water in a hopeless kind of way. After which we hear no more about it.

Quaint details as to diet occur. The patient is to eat fish, if it be not fat, or rich, as we should say. "I will speak to one of our fish-catchers, whom I can depend upon, and get a salmon killed on the morning the post sets off for Ludlow." The post, however, seems unwilling to carry fish, for the voyage from Worcester to Ludlow appears to be a long one. Still a salmon is got through to its destination. "The fish was pretty large and the woman cut off more than she intended. You had nine pounds and a half at a shilling a pound, which, to me, appears an extravagant price, but I can tell you you have it cheaper than any I have bought myself this spring. You may be sure I do not buy it often." At the time of writing this (August, 1909) the price of salmon at Christchurch, Hants, was 2s. 3d. the pound. Lobsters also are promised the sick man, who thus does not seem to lack the indigestible.

In another letter, dated in April, 1776, two guineas and a half are gratefully acknowledged, but the treatment is not neglected. "The medicine I chiefly depend on is an electuary, to be taken twice a day, and washed down with a strong decoction of the inner rind of the elm tree. But previous to the use of it I would have you take a couple of pills, one each night, and work them off on the third day with a gentle purge." The Squire is suspected of drinking a good deal, and he is urged to take cider, if it does not make his skin itch, or "small mild malt liquor."

The correspondence ends here, and we are not informed whether the patient was cured. The bills sent him by his surgeon, Mr. Cole, of Ludlow, are partly preserved. One, a very long one, covers a period between the years 1743 and 1751, and amounts to some £98 odd. The Walker household seems to have been large, and the wagoner's and the dairymaid's bills are included in that of the master. The items mentioned are various and singular, and include such entries as Venice treacle, cordial julep, carminative purging mixture, stomach plaisters, cephalic juleps, tamarinds, corroborating pills, manna, liquorice, and a host of other small matters from a forgotten pharmacopoeia. The several items cost from sixpence to three-and-six. The bills were duly paid.

How the Squire died we are not likely to know. It seems, in some instances, to have been the grim but sensible custom of that or the previous age to go and stay with some skilled person when one felt the end drawing near, just as patients now sometimes go to a nursing home. Among the Walker papers is the following curious bill, made out to the deceased, and delivered to his attorney. The bill dates from 1734, and the dead man is a Mr. Jonas Berrington, a connexion doubtless of the family of Walker. We trust that at this long distance of time we are committing no breach of confidence in reprinting the document!

MR. BERRINGTON DR. TO JOHN DAVIS.

Delivered a Bill to Mr. Harris Attorney ...	£14	10	11½
Paid since ye bill delivd. Shirt Washing ...	0	0	9
For Damage of my Bodye Lining (? linen) ...	1	0	0
For Candles and my Chambers at his Departure	0	6	0
For two Women to Lay him out and three Nights sitting up and Eating, Drinking, and Candles at his Funeral	0	15	6
Twelve Quarts of Syder	0	4	0
For making Oath of his being buried in Woollen	0	0	6
	£16	17	8½

MUNICH ROYAL PSYCHIATRICAL CLINIC.

THE annual report[1] for 1906 and 1907 of this clinic, of which Professor Kraepelin is the director, shows that during these two years 3,746 patients were admitted, of whom 2,446 were male and 1,300 female patients. The striking preponderance of the male over the female admissions was due to the large number of cases of alcoholism treated. Inasmuch as the formation of psychiatrical clinics in England and Wales in the near future appears probable, the clinical forms and their relative frequency at the Munich Clinic are of interest. These were as follows: Alcoholism, 630; manic-depressive insanity, 415; dementia praecox, 317; epilepsy, 317; hysteria, 277; general paralysis, 263; psychopathies (psychopathic personality), 237; senile dementia, 77; imbecility, 56; arterio-sclerosis, 50; cerebral syphilis, 28; idiocy, 11; paranoia, 4; various other categories (morphinism, organic cerebral disease, chorea, not insane, etc.), 98; and not diagnosed, 56.

The large number of alcoholic cases in the above list is notable, and in this relation it should be mentioned that in Munich the police have the power to take helplessly drunk and incapable or drunken and disorderly persons to the clinic, instead of, as formerly, to the police cells. Each of the clinical classes above-named is treated in the report by one or other of the medical staff, and in the following digest the more important of these are outlined.

Alcoholic Insanities.

The total number of cases of alcoholism admitted to the clinic in the two years under review numbered 791 (males

[1] *Jahresbericht über die Königliche Psychiatrische Klinik in München für 1906 und 1907.* München: J. F. Lehmann. 1909. (Demy 8vo, pp. 183; 4 figures. M. 3.60.)

692, females 99), but of these 161 were readmissions, leaving 630 persons admitted. That is, 19.2 per cent. of the male alcoholic cases and 28.2 per cent. of the female cases were readmitted, in some cases several times, during the two years. Of the 630 persons, 353 were cases of simple intoxication; 164 cases of chronic alcoholism; 58 cases of delirium tremens; 14 of Korsakow's psychosis; and 41 of alcoholic delusional insanity. Dr. Filser, who discusses these cases, analyses their total distribution according to age periods, month of admission, and so on, and shows that the cases of simple inebriety were mostly under 40 years of age, whereas the other forms of alcoholism were most common at higher ages. Of the cases of Korsakow's psychosis, for instance, only 4 were below 40 years of age, proving, he says, that this disease is the final stage of many years of over-indulgence.

With regard to the importance of hereditary predisposition to alcoholism, Dr. Filser has to acknowledge the impossibility of obtaining trustworthy histories, a difficulty enhanced by the average short stay—one to three days—of these cases in the clinic. Nevertheless, a drunken parentage was ascertained in 193, or 25.8 per cent., in 3 of epilepsy, and in 13 of other psychoses. An interesting fact disclosed was that the mortality among the children of the alcoholic patients was 45.5 per cent., to which had to be added 15.1 per cent. of prematurely or stillborn children, leaving only 39.0 per cent. who survived their first year. Dr. Filser's contribution also contains an account of the clinical phenomena exhibited by the separate classes of alcoholic patients, which, however, do not require detailed mention here. Most of the cases showed the usual finger and tongue tremor and tender calves, whilst in many cases Romberg's sign was present. Increased knee-jerks were common in the cases of simple intoxication (199 times out of 235), and the usual triad of tremor, neuritis, and Rombergism in the numerous cases of chronic alcoholism. In the great majority of the cases of this latter category, which also offered marked mental symptoms, the importance of delusions of jealousy was well shown. Possibly, as Dr. Filser suggests, these delusions may have some connexion with the heightened *libido sexualis* and lowered potency so frequently encountered in alcoholics. With regard to the true alcoholic delusional insanity (*Alkoholwahnsinn*), the disorder appeared in most cases to set in with a certain hypersensibility to sounds. To this followed suddenly the delusions of persecution and reference with definite auditory hallucinations of an abusive and menacing kind. As already said, the great majority of the alcoholic patients were discharged at the end of a few days; 13.8 per cent., however, were removed to asylums.

Dementia Praecox.

The number of admissions diagnosed as dementia praecox in 1906 was 183, as compared with 134 in 1907. This considerable fall was due to an increasing stringency of classification, the groups of manic-depressive insanity increasing at the expense of the dementia praecox group. This point is discussed at some length by Dr. Weiler, who deals with these cases. He says that an inquiry into the after-history of the 183 cases of dementia praecox admitted in 1906 showed that by the end of January, 1909, there remained in asylums still unrecovered 113, that 11 had died, that 6 were stated to have recovered, and that 26 more were known to have recovered and to have returned to their occupations. Concerning 20 more it was impossible to obtain any information. With regard to these 26 patients apparently entirely recovered, Dr. Weiler asks whether they were the subjects of temporary remission or whether mistakes in diagnosis had not been made. This question Dr. Weiler considers it impossible to answer with certainty, but he clearly inclines to the view of mistaken diagnosis. So long, he says, as the diagnosis is based upon simple clinical observations and the statements of relatives, failures in diagnosis are bound to occur. Amongst other aids to accurate diagnosis, he mentions the absence of Bumke's psychic pupil-reaction (widening of the pupils in response to sensory or psychic stimuli) as of great value. Curiously enough, the uncertainty of diagnosis was much more marked in the female than in the male patients, largely, he says, because of the difficulty of fathoming the female mind. Hereditary influences were ascertained in about one-third of the cases, and 42 per cent. of the male patients were alcoholics. In the great majority of cases the onset was chronic (124) or subacute (64), and in only a few cases (30) was it acute. It is interesting also that in almost all of the cases which afterwards recovered the onset was acute or subacute.

Dr. Weiler gives a detailed description of the nosological features of these cases, for which readers may consult the report. It should be mentioned that an increase of the tendon reflexes was common, and that failure to elicit the psychic pupil reflex above referred to occurred in about 25 per cent. of all the cases of dementia praecox. Also, it is important from the point of view of prognosis to note that no case with absence of this sign subsequently recovered.

General Paralysis.

Only the more prominent of the features of Dr. Plaut's analysis of the 263 cases of general paralysis admitted during 1906–7 need be mentioned here. Syphilitic infection was proved or probable in 113, or 78 per cent., of the male, and in 21, or 57 per cent., of the female general paralytics. Unfortunately, accurate information on the important question of previous antisyphilitic treatment could not be obtained in all cases, but it was ascertained that certainly 57 of the male and 9 of the female patients had undergone specific treatment. The average length of time intervening between infection and first appearance of paralytic symptoms was fifteen years for the men and twelve years for the women patients. Also 41.2 per cent. of the male patients and 15.6 per cent. of the female patients were heavy drinkers. Dr. Plaut furnishes a significant table on the descendence of the patients, showing in the 169 paralytic patients who were or had been married that 29 had been sterile unions; that there had been 153 abortions or stillbirths, and 454 liveborn children, of whom 182 had died, giving a total number of abortions, stillbirths, and deaths of 335, as compared with 272 still left alive. On the clinical side, far the most common initial symptom was a brief vertiginous attack followed by speech disorder or difficulty, and transient palsy, with or without disturbance of consciousness. Of the total general paralytics, the mental state in 56 per cent. of the female and 73 per cent. of the male patients was that of simple dementia; expansives with pronounced psycho-motor excitement and grandiose ideas formed 21 per cent. of the male and 22 per cent. of the female patients, and hypochondriacal delusions with depressive emotions were encountered in 9 per cent. of the male and in none of the female patients. As to somatic signs and symptoms, disturbances of speech were most frequent (males 889, females 82); then disturbances of writing (73 per cent.); next alterations of pupil reactions (males 65 per cent., females 75 per cent.); then hypalgesia; and lastly altered knee-jerks. With regard to this latter phenomenon, the knee-jerks were absent in 17 per cent. of the males and 15 per cent. of the females; different in 5 per cent. of the males and 8 per cent. of the females; increased in 40 per cent. of the male and in 45 per cent. of the female patients; and normal in 38 per cent. of the male and in 23 per cent. of the female patients. The serological investigation of the cerebro-spinal fluid in the paralytic cases is treated in another part of the report by Dr. Plaut, but may be alluded to in brief here. Wassermann's reaction appears to have been mainly used, and proved of great diagnostic value. With this test general paralysis gives a positive reaction with both blood serum and cerebro-spinal fluid, whereas cerebral syphilis gives a positive serum and a negative cerebro-spinal fluid reaction. Occasionally, here and there, with undoubted cerebral syphilis, the serum reaction was not present, but, on the other hand, in general paralysis the serum reaction was so generally obtained that its absence, Dr. Plaut says, almost certainly excludes paralysis. Further, Dr. Plaut says, the fortunate circumstance, that even in the earliest stages, where clinical signs are doubtful, the spinal fluid and serum reactions are so invariably present that they furnish most weighty evidence. No reaction; no general paralysis.

Epilepsy.

The number of epileptics admitted to the clinic during the two years was 317, but so many of these were *Stammgästen* (regular customers) that, in all, 534 cases were admitted on account of epileptic mental disorders.

The greater number were admitted because of ordinary epileptic attacks, but 51 on account of epileptic excitement, 10 after having made attempts at suicide, and 60 because of intoxication. The importance of alcohol was well shown by the fact that 199 of the male epileptics, or 75 per cent., were, according to their own accounts, given to drink; whilst inquiry into the family history showed that 25.2 per cent. of the male and 28.8 per cent. of the female epileptics had drunken parents. Touching this question of alcohol, the ages at which the first symptoms of epilepsy appeared is instructive, for whereas in none of the women did the illness begin after the thirty-fifth year, it began after this age in 11.2 per cent. of the men. Of 59 men in whom the epilepsy appeared after the thirtieth year of life, 81.3 per cent. indulged to excess in alcohol, mostly in the form of schnaps.

At the end of the report Dr. Rohde gives a summary of work done by him in the chemical laboratory with regard to some cases of epilepsy. The excreta were carefully analysed over lengthy periods, in particular the output of nitrogen, uric acid, ammonia, and chlorium being estimated. In the first three cases investigated no specific anomaly was found, but only a retarded and insufficient conversion of nuclein bodies into uric acid. In a fourth case, and two others of status epilepticus, fully reported in the *Deutsch. Archiv. f. klin. Med.*, Bd. 95, the uric acid and albumen metabolism was normal during the intervals between the attacks. The nitrogen of the food, however, was not later fully excreted, but was retained in great mass and excreted in large quantity at the time of the attacks. During the days of the attack the increase in the pulse and blood pressure was accompanied by an increased acid excretion, pointing to a disordered metabolism with the formation of an abnormal organic acid (? lactic acid). Immediately after the onset of the attacks the acid excretion reached its maximum, as much as 2.5 grams of dextro-lactic acid being found in the urine. Parallel with this went a rapid hyperleucocytosis, the number of leucocytes rising in a few minutes from 7,500 to about 19,000, and falling again in half an hour. The attacks closed with an increased excretion of uric acid and phosphoric acid, beginning some hours after the first attacks. As attack succeeded attack, however, the evidences of disordered metabolism given above grew less and less, so that towards the end, notwithstanding the attacks were as frequent as ever, the urine differed only slightly from the normal.

Other papers will be found in the report on manic-depressive insanity (Dr. Zahn); on hysteria and psychopathic personality (Dr. Wettermann); and detailed accounts of different smaller groups of mental disease by Dr. Weber; and cases of doubtful diagnosis by Dr. W. Specht.

Finally, Dr. Alzheimer furnishes the usual information as to the *post-mortem* results in those who died during the two years, and describes the microscopical findings in a number of selected cases.

Medical News.

THE authorities of the Metropolitan Hospital Saturday Fund have fixed Saturday, October 16th, as the date for the special appeal this year.

THE annual dinner of the Association of Public Vaccinators of England and Wales will be held at the Adelphi Hotel, Liverpool, on Friday, October 29th, at 6.30 p.m.

THE House of Representatives of the State of Georgia has passed a bill giving legal recognition to osteopathy as a system of medical practice in that State. The medical profession is urging the Governor not to give his assent to the bill.

THE next meeting of the Society for the Study of Inebriety will be held in the rooms of the Medical Society of London, 11, Chandos Street, Cavendish Square, W., on Tuesday, October 12th, 1909, at 4 p.m. Dr. J. Milne Bramwell will open a discussion on suggestion and its rôle in the treatment of inebriety.

AT the Middlesex Sessions last Wednesday a nurse on the staff of the North-Western Fever Hospital—Miss Stebbington—was highly commended by the Bench for her courage in bringing about the capture of a street thief. She saw him snatch a gold watch and chain, and pursued him through sundry courts and alleys until he was caught. The man was sentenced to three years' penal servitude.

THE Lord Mayor of London, Sir George Wyatt Truscott, will lay the foundation stone of the new building of St. Mary's Hospital for Women and Children at Plaistow, E., at 3 p.m., on the afternoon of Saturday, September 25th. The cost of the work and furnishing will amount to £17,000, and with a sum of £3,000 promised by King Edward's Hospital Fund, the committee of the hospital has available for the purpose £14,100. There is, therefore, a deficiency of £2,900 to be made up, and any donations for the purpose will be gladly received by the committee.

THE Caledonian Medical Society held its annual meeting this year at Lancaster. The meeting was held under the presidency of Dr. Blair, who explained that devotion to Gaelic medical literature was a special feature of the society. It had received a translation of a valuable manuscript. Most of the Gaelic manuscripts he had read had been translated by the agency of the society, and the scholar engaged in the work was endowed by the society. During the year its members had made several contributions to general medical literature

CHOLERA is said to be again increasing at an alarming rate in St. Petersburg and other ports of Russia. A suspicious case of death which occurred at Amsterdam on September 13th is officially declared to be due to Asiatic cholera. Rotterdam is free from the disease. Owing to the presence of cholera in Holland, however, the Belgian Government has instructed the burgomasters to warn people against the eating of oysters and mussels. The reports that cholera has appeared in Belgium are stated to be false.

A RECEPTION of the members of the Child Study Society, London, will be held by the President, the Earl of Stamford, at 8 p.m., on Thursday, October 7th, at 90, Buckingham Palace Road. Short addresses on child study will be given by Miss Alice Ravenhill, F.R.S.I., C. W. Kimmins, D.Sc., M.A., and G. E. Shuttleworth, B.A., M.D. Among the lectures to be given at later dates are the following: The care of children under the Poor Law, by the Right Hon. Sir John Gorst, M.P. (October 28th); the child criminal, by W. C. Sullivan, M.D., Medical Officer of Holloway Prison (November 18th); and on mental fatigue, by A. R. Abelson, D. ès L. (December 9th).

QUESTIONS as to Chinese pigs have recently somewhat relieved the weariness of the debates on the Budget. A very bad character, in a sanitary sense, was given to these animals. A report by Dr. Herbert Williams (Medical Officer of the Port of London) on a consignment of pigs received on July 24th has just been issued. He says that the pig carcasses on arrival were found to be very large and fat, and each one had a label attached to it stating that it had been subjected to a medical examination at the port of shipment. Dr. Williams selected 100 pigs at random, and after examination found nothing indicative or suspicious of trichinosis.

THE fifty-fourth annual exhibition of the Royal Photographic Society of Great Britain commenced at the New Gallery, Regent Street, on Thursday. It will be open from 10 a.m. to 6 p.m. until the end of October, and from 7 p.m. to 10 p.m. in the evening on Mondays, Thursdays, and Saturdays, on which days lantern lectures will be given in one of the rooms. By the courtesy of the committee we had an opportunity of examining the accepted pictures before the opening, and found the exhibition thoroughly worth a visit, even by those who do not take any special interest in photography. An exceedingly high standard of work would appear to have been imposed on would-be exhibitors. In any case the proportion of really artistic work among the pictures shown is very high. In some of the sections we recognized the names of a good many medical men. In the scientific and technical photography section Dr. J. Gray Duncanson of Shooter's Hill (metamorphosis of the dragon fly); Dr. G. H. Rodman, of Mortlake (magnified photomicrographs of the diatom *Heliopelta metii*, and radiographs of shells); Dr. C. L. Leonard (pictures illustrating the actual movements of the heart and stomach); Dr. G. Fedor Haenisch (the normal kidney); Dr. Francis Ward, of Ipswich (the life-history of plaice); Mr. Francis Heatherley, of Birkenhead (a hooded crow feeding its young). In the Autochrome Section: Dr. A. Goodman Levy, of Manchester Square (watercress beds); Dr. H. G. Drake-Brockman, of Cleveland Asylum (still life and the casting of pig-iron); Dr. G. Lindsay Johnson (a stained glass window). Among those who are to deliver lantern lectures are Dr. Francis Ward (September 27th, a visit to a marine biological station), and Mr. Adolphe Abrahams (October 9th, the photography of sport).

British Medical Journal.

SATURDAY, SEPTEMBER 25TH, 1909.

SCHOOL SPORTS.

DEBATES have this in common with babies, that they are commonly christened at their birth, and, when grown up or completed, continue to bear names as little appropriate to their true character as that of Diana to a contented sewing maid. Something of this inconsequence attaches to the series of papers which commence this issue. And, in the circumstances, this is perhaps fortunate. The phrase "medical aspects of athleticism," strictly interpreted, covers but a narrow field, while the matter recorded spreads over so wide an area as to be of interest and importance to the fathers and mothers of all public schoolboys and to all well-wishers of the nation at large.

The papers represent a debate carried on at the Belfast meeting of the British Medical Association in July, and, for the most part, the views held are expressed in such simple and natural terms that, in all senses, he who runs may read with clear understanding and advantage. Furthermore, the men whose beliefs the papers present are, in varying professional connexions, of such weight and authority that, taken as a whole, the papers may be regarded as the last word on the subject so far as principles are concerned.

In arranging for the holding of such a discussion, the authorities of the Section of Medicine were perhaps influenced by the fact that early this year an attack was made on the outdoor exercises common in schools and other places where the young of both sexes congregate. Possibly, on the other hand, it was held merely because the right upbringing of young people is a subject of perennial interest, and it is well that it should be seriously debated from time to time if only by way of bringing into true focus facts and ideas which in a somewhat namby-pamby age are apt to have too much importance attached to them.

The general facts concerning the early and late effects of active exercise in boys and young men were reviewed in an editorial article in this JOURNAL some six months ago, and a mere quotation of the verdict which we ventured to return on our own account on that occasion would serve, we are glad to find, as a not inadequate summary of what was said by the experts assembled at Belfast. In an age, however, when questions of interest pass before the mental vision of all educated people with cinematographic rapidity, six months is a very long time; it may be well, therefore, to review the subject again solely in the light of what was said at the recent annual meeting.

Time and again the public has been invited to believe that the youth of the nation is being physically ruined on those very fields on which, according to Wellington, the battle of Waterloo was won. It is illuminating, therefore, to find that, dispassionately examined, this charge proves to be nothing more than a hasty generalization based on a not always correct interpretation of certain rare incidents. On the other hand, the converse view is supported by general professional experience, and in addition has the assured foundation of statistical investigations carried out by competent persons over a sufficiently long period and dealing with a sufficiently large number of individuals to satisfy the requirements of even that somewhat exacting person, the latter-day biometrician. For details we refer to the papers themselves, and here merely state that, whether as regards immediate mortality or eventual morbidity, the ill results even of the most strenuous and sustained school and university physical exercises would seem properly to be represented by an extremely small decimal.

It is not really surprising, however, that erroneous views on the subject should often gain prevalence. Mankind is human, and boys, as a famous American character used to say, are the same, only more so; and our public schools contain a considerable proportion of youths whose undesirable tendencies are fostered, not checked, by their home lives. Self-indulgent and averse from active endeavour of any kind, they are only too glad of some excuse for passive resistance—for shirking taking part in games in which they do not excel, and in sports in which they do not feel any particular interest. Their mammas are malleable, and a visit to the family medical man does not always result in a well-balanced opinion. If symptoms of ill health are found or evidence of cardiac morbidity be present, it is easy to overlook the fact that their existence may often be much less readily explained by a theory of over-exercise than by other circumstances common in the lives of schoolboys. A clear and full account of the habits of the patient under examination should be obtained—a task often of extreme difficulty in dealing with reticent schoolboys—and in addition Mackenzie's observation that the cardiac area in perfectly normal young people often appears enlarged and that the heart rhythm is habitually more easily disturbed in children than in adults, should be borne in mind.

Even, however, if the view that damage to health is commonly the outcome of athletics in general were very much better founded, it would still be the duty of the medical profession and of parents to encourage schoolmasters to carry them on. Whatever their present frequency, the ill results are entirely preventable, and the net value both to the individual and to the nation at large of the strenuous games and exercises popular in English public schools for an untold number of generations can hardly be over-estimated.

Modern investigation has in nowise discounted the belief in a direct inter-relation between mental and physical development represented by the old saying, *Mens sana in corpore sano*, and the effect on body and mind of the formal gymnastic exercises common in Continental schools is in nowise comparable to the outcome of the English system. By taking part in organized games demanding observance of rules, rapidity of decision and action, courage and co-operative action, boys acquire instincts of infinite value in after-life, while the school runs and paper chases occasionally substituted often bring out and develop unexpected good qualities in boys less capable than their fellows in ordinary games. Furthermore the English system—if excellent for normally active-minded, active-bodied boys—is still more desirable in the happily exceptional case of those in whom early training or a long bygone bout of illness has accentuated an inclination towards loafing and more or less solitary forms of amusement; and, except in

the case of cripples and definite invalids, participation in organized games of one sort and another should be absolutely compulsory in every school.

In respect of such ill-results as are ever attributable to over-exercise, it is important to note that professional experience shows them to occur as a rule not in the weakly, but in those who habitually excel at games and sports. Some degree of injury is not very uncommon among exercise-loving adults, young and old, who, mindful of their prowess in the past, forget when on a holiday the need for preliminary work; and, in somewhat different sense, the same remark holds good of quite young people. The average schoolboy, it is true, is habitually in fairly good training, but it is not realized either by boys or by their elders and guardians that quite a short bout of ill health—a bad cold, a touch of influenza, and still more an attack of infectious malady—is the equivalent of a prolonged period of entire inactivity. It is on the necessity for caution in this respect that the medical profession should insist.

For the rest, it lies in the hands of school authorities to rid school sports of all fear of reproach. The present trouble, so far as any exists at all, originates in the fact that, while it is recognized in theory, it is not sufficiently recognized in practice that the object of a public school career is physical, as well as mental, education and development. Every boy on entry should have his physical capabilities assessed by the school medical officer as carefully as is his mental knowledge; and by one means and another throughout their school career all boys should be classified and reclassified for athletic exercises not according to age but to actual ability shown, and as habitually and carefully as they are for school work commonly so called.

All this could be arranged without material interference with the system on which all well organized schools are already worked. The facultative officers already exist—the school medical officer as consultant, games-loving masters, and intelligent boys; in short, all the foundation of a complete system for classing boys and watching and guiding their progress. Every headmaster is capable of working out details for himself, and the only direction in which outside stimulus is perhaps required is in respect of a due interval being allowed to elapse between meals and the commencement of games. Schoolmasters know just as well as other people that active exercise on the top of a heavy meal is a very undesirable thing; but sometimes they are disposed to overlook the fact, because the circumstances of school life make the arrangement of a sufficiently long interval a matter of some difficulty.

THE CARE OF THE EYES AMONG THE WORKING CLASSES.

ADAM SMITH, in his *Wealth of Nations*, points out that one of the chief factors in the production of wealth in a State is the proportion that the number of workers bears to that of the non-workers. Every worker, therefore, who has to leave the active ranks because he is unable to see sufficiently well to continue at his trade represents a direct loss to the potential wealth of the State. In addition, he and his dependants may become a public charge, and then the loss of wealth is a double one.

In every modern civilized country a very large number of active workers are annually incapacitated by eye diseases, the direct or indirect results of their occupations. A great deal of this complete or partial blindness could be prevented, and thus a great loss of capital to the State and hardship and suffering to the individual would be avoided.

Much has already been done to supervise the eyesight of children in elementary schools, but up to the present his parents have been in this respect much neglected. In France the subject has been brought before the Academy of Medicine by Motais, and the Committee have agreed to recommend certain procedures.[1]

Motais considered the subject from two aspects: that of definitely dangerous trades, where the eye was likely to be wounded or injured, and that of trades which caused excessive eye strain (*métiers appliquants*). He found 30 per cent. of myopes among compositors, and 65 per cent. among lithographers, figures strictly comparable with the percentage of myopes found in the upper forms of the German *Gymnasia*. He drew attention to the enormous number of eye accidents caused by emery wheels, fragments of iron, and other similar agencies, treated in the hospitals, most of them ending in more or less deterioration of vision. Another fertile source of partial blindness is the common hypopyon ulcer which so often follows a trifling abrasion of the cornea, received perhaps from a minute fragment of flying emery.

As regards the trying occupations—engraving, dressmaking, and similar trades—immediate attention should be given to the question of illumination, a subject generally considered by the manufacturer rather from a financial than from a hygienic standpoint. So bad is the lighting of some dressmaking establishments, that the workers frequently, Motais says, prick their noses with their needles. He asks, if our scholars under vastly superior hygienic conditions develop myopia, what can we expect to happen to our seamstresses and engravers? The question is a vast one, and even in the department of Maine-et-Loire concerns 17,000 individuals. In the whole of France over a million and a half of seamstresses, tailors, engravers, and clerks are working under conditions which are generally inimicable to the preservation of good vision. We may add that in England the conditions are substantially the same. To remedy this state of affairs it is necessary to reform the factories and to teach the working classes ocular hygiene.

In the dangerous trades in France, nearly two million are liable to accidents which may cause partial or total blindness. Much can be done to obviate the large majority of them, or to discount their effect. Irritating vapours in chemical works can be excluded by a mask; dust can be kept away from the eyes by efficient ventilation; flying objects can be excluded by spectacles; and a knowledge of the value of surgical cleanliness inculcated. Almost every engineering shop contains one or more "eye specialists" to whom the employees resort when a foreign body lodges in their cornea. The fragment is or is not removed with a filthy penknife after the cornea has been well scratched, and perhaps inoculated with a staphylococcus. A diffusion of knowledge would lead a small proportion of these victims to seek medical aid.

Motais made the following suggestions, which were adopted by the Committee: No child under 13 shall

[1] *Bulletin de l'Académie de Médecine*, No. 18, Séance du 4 Mai, 1909.

be admitted to any factory where a trying trade is carried on without a certificate of physical aptitude, to be obtained gratuitously from a medical man appointed for the purpose; pamphlets on ocular hygiene are to be distributed among the working classes; the Factory Acts prescribing sufficient light, ventilation, and washing accommodation to be rigorously applied; suitable spectacles to be used in all trades in which foreign bodies are liable to be projected into the eye; if the workman be exposed to excessive glare, the spectacles are to be orange yellow.

The subject is such a large one and is of such essential importance in this country as well as on the Continent, that it would be highly desirable for the present Government to appoint a Commission to inquire into the whole question, and adopt legislation to alleviate the evil.

NATIONAL EUGENICS.

THE staff of the Galton Laboratory having found the need of an introduction to the science of eugenics more likely to be intelligible to the layman than are their technical memoirs, Professor Pearson has recently published an abstract of a lecture entitled *The Problem of Practical Eugenics*.[1] The lecture is informed with the public spirit and composed in the incisive language which have always distinguished Professor Pearson's writings; in view, however, of the fact that it is addressed to a lay audience, it appears to us that many statements contained in it are apt to lead to serious misunderstanding with regard to public health legislation during the last fifty years.

Professor Pearson first summarizes the evidence published by himself and his pupils which proves, in his opinion—an opinion which we share—that the mental and physical characters of man are inherited in a manner susceptible of direct quantitative expression, and calls attention to the important truth that these results depend in no way on the acceptance of any special physiological theory of inheritance. He next adduces evidence that the marked fall in the birth-rate, which has attracted so much attention in recent years, is associated with modern factory legislation, the latter having destroyed the value of young children as wage earners, and therefore removed the economic incentive to procreate a numerous progeny. This leads him to make rather strong comments on the authors of modern factory legislation. Professor Pearson writes:

"We pride ourselves as a nation on our factory "legislation. We have limited the employment of "women and children, and sought thereby to improve "their conditions of life and health. Environment "must be bettered; our legislators never once asked "what will be the effect of this betterment on "parentage?" Further on, he writes: "Now it seems "to me that we have an illustration in this matter of "a case—and it is not an isolated case—in which "legislation intended to promote national progress—"to improve the racial qualities of future generations "—has directly tended to enfeeble the race; in the "first place by reducing the intensity of natural "selection, and in the second place by producing a "population of lower average fitness." These criticisms seem to us to indicate an imperfect understanding of the legislation in question—legislation which has received the general approval of the medical profession. Legislators have to consider not merely the problematical reaction of their measures upon a subsequent generation, but also their effect on contemporary conditions of life. That the factory legislation was conducive to a more civilized, we might almost say to a less bestial, state of existence among the industrial classes, is a proposition no medical publicist will challenge. Professor Pearson may retort that the penalty has been paid by a later generation in the form of a diminishing birth-rate among the "fit" classes, and a more or less stationary rate among the "unfit" strata of the population; but it is not quite clear that such a statement is unequivocal. To reduce the intensity of natural selection, to use Professor Pearson's phrase, may not be by any means an unmixed evil. It is an elementary truism that "the fittest" means the fittest under a given environment. What reason have we to think that the fittest to survive under pre-factory Act conditions are desirable citizens of a modern State? Under those conditions the parents who were most successful in placing their children in profitable employment had an undoubted advantage in the struggle for existence over those more self-sacrificing persons who sought to protect their offspring as long as possible from the weary round of toil. Neither the desire nor the ability to exploit one's young children argues the possession of that type of social qualities we wish to see propagated. Professor Pearson states that from inquiries he has made, the "condition of the child as a pecuniary asset "was not wholly a bad one; it must be kept in health "because it ceased to have a pecuniary value if it "broke down." This is somewhat misleading. That a certain minimum of physical efficiency was necessary for the labouring child is obvious, but numerous official reports demonstrate how low that minimum was pitched and how desperate was the condition of many persons of tender years when unprotected by sanitary enactments. It must also be observed that the evils from which we suffer may be as much due to the conditions which the Factory Acts were intended to remedy as consequences of those Acts themselves. It may be that the "unfit" population which now over-reproduces itself is the offspring of the population which was "fit" under the old conditions, and would itself be "fit" if those conditions could be revived.

Professor Pearson inveighs against the Old Age Pensions Act ("hasty vote-catching legislation") and the facilities provided for rearing degenerate offspring in public and private institutions, urging as an alternative the national importance of endowing healthy parenthood. He proposes the diversion of some part of the funds now expended on the maintenance of the degenerate to the subvention of healthy parents. If the supply of public institutions and money for the degenerate and "unfit" exceeded the demand such a scheme would be admirable, but this is hardly the case. It can scarcely be maintained that a diminution in the amount spent on "unfit" children would really lower the birth-rate in the degenerate classes of the population to an extent which would compensate us for the increased misery inflicted. Degenerates are, unfortunately, not likely to be deterred from reproducing their kind by the thought that the fate of their offspring will become even less advantageous than it is at present.

While Professor Pearson's pamphlet does not, as a whole, impress us very favourably, we gladly recognize its strong points, as, for instance, its powerful advocacy

[1] *The Problem of Practical Eugenics.* By Karl Pearson, F.R.S. Eugenics Laboratory, Lecture Series. London: Dulau and Co. 1909. Pp. 38.)

of a scheme of national insurance. An interesting investigation would be to make a comparison between national fertility at the present day and at a period before the rise of early nineteenth century industrialism. It seems possible that the dangers of race suicide may be exaggerated by choosing for comparison with the present day an epoch in which children were pecuniary assets. It is to be feared, however, that the imperfections of the earlier records would render such an undertaking difficult.

DOCTORS AND THE DEATH DUTIES.

THE letter signed "A Hard-working Physician," which appears in another column, draws attention to an aspect of the proposals in the Finance Bill that closely concerns the medical profession. With most medical men life assurance is a practical necessity. Not only have they to provide for the day when they are no longer able to earn fees, but the special risks incidental to their vocation make it imperative in most cases that the provision should take the form of life assurance. The encouragement given to this form of thrift by the Legislature by means of relief from income tax to the extent of the amount of the premiums is given alike where the income is derived from property and where it is derived from the exercise of highly-trained skill in an arduous profession. Differentiation is made to a certain point in the rates of income tax charged on earned and on unearned incomes, but when it becomes a question of the toll to be levied by the State on the family provision made perforce by the setting aside of income hardly earned in the rendering of an often insufficiently paid social service, no regard whatever is had to the source from which the "sum passing at death" has arisen, nor to the necessities imposed by the conditions under which the provision has arisen. The Chancellor of the Exchequer has, more particularly in his Limehouse speech, shown his appreciation of the exceptional conditions under which the medical man's work is performed, and it will surely not be asking too much of him that at least the same extent of differentiation should be made in the death duties charged on a medical man's estate as is now made for income-tax purposes between earned and unearned incomes. The clauses of the Finance Bill relating to the death duties have passed the Committee stage in the House of Commons, and the bill will reach the Report stage within a few days. Immediate and energetic action is therefore called for if an amendment of the provisions relating to the death duties is to be obtained before the bill finally passes the Commons.

COURT-MARTIAL ON A FLEET SURGEON.

A REPORT of a court-martial recently held at Portsmouth for the trial of Fleet Surgeon C. G. Matthews for behaving with contempt towards his superior officer will be found at p. 921. The case affords a striking illustration of the grave dangers to which naval medical officers are exposed without any chance of redress. A senior medical officer, holding the same relative rank as the temporary superior whom he was charged with treating with contempt, is subjected to gross insult, to treatment no self-respecting man would endure without protest, to having charges of the most trumpery kind in themselves made against him, and finally has to undergo the indignity of a trial by court-martial, with all its attendant anxiety and the risk of being ruined professionally—all this, because a young officer, dressed in a little brief authority, takes advantage of the absence of the captain of the ship on leave to abuse the enormous authority with which he is invested by the Admiralty. Fortunately, the evidence was so flimsy in itself, and so entirely unsupported, even by the commander's subordinates, that the court-martial had no alternative but to acquit the medical officer. But the matter might very easily have had a different ending, and the service might have lost a first-rate medical officer, sacrificed to the whim of a jack-in-office. The case illustrates very well the feeling a certain class of executive officer has for the naval medical officer. Here the commander, although he had been six weeks in the ship, is far too high and mighty a person in his own esteem even to take the trouble to know the name of an officer equal to him in rank and superior to him in age, and probably in manners and everything else that goes to the making of a gentleman. This feeling is unfortunately not altogether so uncommon in the navy as it should be, although it is not easy to see why this particular class of executive officer should think so much of what is after all its not very exalted dignity. There is no redress; the medical officer has to suffer in silence, or, should he venture to protest, he must risk the ruin and disgrace of an adverse verdict of a court-martial, with none of the safeguards which would be offered if representatives of his own branch of the service were members of the court. The Admiralty are now advertising fifteen vacancies for commissions in the medical branch of the navy. This case will have served a useful purpose if it deters young doctors from entering a service in which they are exposed to such treatment. Young medical men whose inclinations may point towards the Royal Navy as a career cannot be too often or too strongly warned that they are liable at any moment to be the subject of trumpery charges should they happen to serve under some commanding officer who rejoices in showing the arbitrary authority with which the wisdom of the administrators of the service has clothed him, and that their careers in life may thus be ruined. These charges can be brought with absolute impunity, and without any fear of consequences to the officer who brings them. Even should a medical officer be fortunate enough to secure an acquittal when tried by court-martial, the stigma remains for ever, and his future prospects of advancement in his profession are blighted. However insulting and however provocative a commanding officer may be, the medical officer must "know his place." Any objection he may make, however respectfully worded, can be construed into an offence against the fetish miscalled discipline, with unfortunate results to the so-called offender. Discipline is, of course, necessary, but that under its cloak it should be possible for such a case as that recorded to occur shows the need for drastic reform in the position of the naval medical officer. In the meantime the attention of the First Lord of the Admiralty might advantageously be called to the conduct of Commander Walters.

PROFESSOR JOHN CLELAND.

ON the initiative of the Business Committee of the General Council of the University of Glasgow, it has been resolved to take steps to recognize in some appropriate manner in connexion with the university, the long and distinguished services of Dr. Cleland as a teacher, author, and man of science, on the occasion of his retirement from the Chair of Anatomy. The form which the recognition will take must in large measure depend upon the amount subscribed, but it is thought that it might fitly include the provision of some fund for the advancement of anatomical and

anthropological science and the presentation to the university of his portrait or bust by an eminent artist. A committee, with power to add to its number, has been appointed to carry out the proposal. Among its members are President Anderson, Sir William Arrol, Sir Matthew Arthur, Bart., Professor Bayley Balfour, F.R.S., Sir James Crichton-Browne, J. H. Balfour Browne, K.C., Professor Alex. Crum Brown, Professor Thomas H. Bryce, Professor Sir Hector C. Cameron, Professor Murdoch Cameron, Professor Chiene, C.B., Sir Henry Craik, M.P., Professor A. Francis Dixon, Sir Nathaniel Dunlop, C.O. Hawthorne, M.D., Professor G. G. Henderson, William Henderson, Esq., Sir James King, Bart., Brevet Lieutenant-Colonel Sir William B. Leishman, R.A.M.C., A. Ernest Maylard, B.S., Professor Robert Muir, Professor Alexander Macalister, F.R.S., Principal Sir Donald MacAlister, K.C.B., Principal J. Yule Mackay, Professor J. G. McKendrick, Donald J. Mackintosh, M.V.O., James MacLehose, D. C. M'Vail, the Right Hon. Lord Newlands, Sir Thomas Oliver, Professor D. Noel Paton, Professor A. M. Paterson, Professor J. S. Phillimore, Sir John Ure Primrose, Bart., the Right Hon. the Earl of Rosebery, Professor R. W. Reid, the Lord Provost of Glasgow (the Hon. A. M'Innes Shaw), Professor William Stirling, Professor Ralph Stockman, President Bertram C. A. Windle, F.R.S. A circular which has been sent out to all university graduates and to members of other learned bodies bears the signatures of the Earl of Glasgow, Sir John Stirling Maxwell, Bart., Sir James Fleming, Professor John Glaister, President of the Faculty of Physicians and Surgeons in Glasgow, and Dean of the Faculty of Medicine in the University; A. M'Innes Shaw, Lord Provost; Sir Hector C. Cameron, John Smith, D.D., Convener of Business Committee, University General Council; and Dr. John Yule Mackay. The Honorary Secretary and Treasurer is Archibald Craig, Esq., LL.B., 149, West George Street, Glasgow.

THE RELATIONS OF OPHTHALMOLOGY AND MEDICINE.

WE remember a well-known surgeon delivering himself of an aphorism as to specialists: "Specialists "are specially ignorant." Ophthalmologists have in the past merited this sweeping condemnation in some degree; concentrating their regard upon one organ of the body, they have neglected the general organism; and have often shown much special ignorance of morbid conditions outside the eye which were responsible for the local defect they were vainly endeavouring to remedy. Who has not seen a surgeon forcing enormous probes down a lacrymal duct, to remedy an obstruction caused by a deformity of the inferior turbinal, which he never thought of examining. Again, how many patients have lost much useful vision, because the ophthalmic surgeon never recognized that the amblyopia was due to a suppurating ethmoiditis or a distended spheroidal sinus? Green[1] traces the dependence of the ophthalmic surgeon upon the general physician, the neurologist, the rhinologist, the dermatologist, the urologist, the dentist, and the gynaecologist. The growing belief that many obstinate cases of phlyctenulae, of cyclitis and choroiditis are really tuberculous toxaemias, and the knowledge that they can often be most effectively treated with tuberculin renders collaboration between the ophthalmic surgeon and the physician highly desirable, nay essential. The intimate connexion between ophthalmology and neurology need not be insisted upon; they are indeed so close that the neurologist must be a good ophthalmologist and have an intimate knowledge of ocular dynamics, and no one can truly call himself an eye specialist who has not a thorough knowledge of the essential symptoms of the commoner disorders of the nerves. The epoch-making researches of Onodi upon the anatomy of the accessory sinuses of the nose have made it essential for the ophthalmic surgeon to be in some degree a rhinologist, otherwise he cannot recognize the ultimate cause of many morbid processes both within the globe and external to it in the orbit. Finally, the certainty that much chronic cyclitis is the result of oral sepsis brings him into relationship with the dentist. We are somewhat surprised that the author seems to regard the urethral origin of iritis as not proven, for gonorrhoeal iritis is a very real pathological entity. Papers further illustrative of the interdependence of ophthalmology and general medicine will be found in the account of the Proceedings of the Section of Ophthalmology at Belfast in this issue.

[1] *Ophthalmology*, April, 1909.

THE OPHTHALMOLOGY OF THE PHARAOHS.

THE knowledge of diseases of the eye and their therapy among the ancient Egyptians would appear to have been very meagre; in fact, as Galen says, it was "foolish stuff." In 1872 Ebers brought a papyrus from Egypt, which when deciphered proved to be a treatise upon medicine. A small portion of the hieroglyphic manuscript was devoted to the eye and its diseases. Even at that early date cataract was treated, as it now is by the *fellah hakim*, by couching with a sharp reed. Nebenchari, a celebrated oculist, was sent by Amasis, King of Egypt, to Persia to operate upon Kassandare, the mother of Cambyses, son of Cyrus, who was blind from senile cataract. While he was away his rival Pentammon stole his manuscripts and learnt how to perform the operation, which he undertook upon Amasis himself. In the tenth century B.C. there was a medical college among the priests at Thebes, where, among other subjects, ophthalmology was taught. After learning the preliminary work at Thebes the students went to Heliopolis to perfect themselves in special work. They then returned to Thebes to practise their art. Wilkinson, in the *Annals of Ophthalmology* for July, 1909, gives a full account of the manuscript.

THE MECHANISM OF MOTOR FATALITIES.

IN reading the accounts of motor-car accidents, now unfortunately of daily occurrence, one cannot but be struck by the fact that in most instances some of the occupants of the car usually escape with little or no injury, while others are more or less horribly mutilated. The driver, in fatal cases, usually succumbs to injuries inflicted by the car overturning, and pinning him between the steering-wheel and the soil, to crushing of the thorax by violent contact with the steering wheel in forward collisions, or to his getting jammed between the steering-wheel and the back of his seat. With regard to the others, it is worthy of note that nearly all the fatal injuries are caused by persons being pitched out of the car, and it is indeed remarkable how trivial an accident may determine serious results from this cause; a slight collision, nay, even the rather sudden application of the brakes, may suffice to disturb the relationship of the car and its occupants. In considering the question as to how these lethal consequences are to be avoided, we apprehend that little can be done to protect the driver in the absence of some more commodious appliance than the present steering-wheel. Much, however, might be done to minimize the risk of being flung out of the car by unexpected variations of speed. As at present arranged, the seats are so deep that the legs of the average person do not reach the floor; consequently, abrupt arrest causes the body, unprovided

with any *point d'appui*, to be thrown forward, and the head is driven against the glass panel, or the person is hurled bodily into the roadway. Even when the feet do rest on the floor they have no trustworthy grip, it being a plane surface at an obtuse angle with with the body. The inference to be drawn is that cars should be provided with adjustable foot-rests at a proper angle. Such a contrivance, which should not baffle the ingenuity of motor engineers, would not only afford some measure of security of tenure in respect of the seat, but would add considerably to the general comfort of travellers, who pass many hours in a more or less cramped position.

INDIAN INDIGENOUS DRUGS.

THE committee appointed at Calcutta for the purpose of making trials of the therapeutic effects of indigenous drugs has issued a second report which covers the following twelve drugs: (1) Podophyllum emodi, (2) alstonia scholaris, (3) picrorhiza kurroa, (4) adhatoda vasica, (5) calatropis procera and gigantea, (6) acacia catechu, (7) caesalpinia bonducella, (8) ipomaea hederacea, (9) andrographis paniculata, (10) embelia ribes, (11) rheum emodi, (12) cassia montana. The evidence regarding the action of these drugs is summarized, but varies considerably in character and value. Much of it consists of vague opinions, favourable or otherwise. Podophyllum emodi is pronounced to possess the same merits and defects as podophyllum pellatum. Ipomaea hederacea (*Kaladana*) was ascertained to be a strong purgative resembling jalap. Calatrophis (*Mudar*) was found to be useful as a substitute for ipecacuanha in mild cases of dysentery. The leaves of cassia montana have found their way into the London market and been sold as senna, but reports of its use are discouraging. The evidence regarding the other articles is inconclusive, and further and more searching trials are necessary.

SLEEPING SICKNESS.

IN the *Sleeping Sickness Bureau* for August (No. 9, 1909) Dr. Bagshawe gives another paper by Professor Kleine on the etiology of sleeping sickness. It deals with the development of the trypanosomes inside the tsetse flies and is interesting though perhaps not quite conclusive. Parasites, according to Kleine, were never found in flies which had not become infective three weeks after feeding on a sick animal (that is to say, if the fly after three weeks was incapable of giving infection parasites would not be found in its stomach), nor in flies which had had no opportunity to infect themselves, nor in fifty bred flies fed on healthy monkeys. In infected flies many different forms were met with; typical *Gambiense* forms could easily be demonstrated in the intestine, and sometimes in the proboscis juice as well, while in addition, broad forms staining blue (females), forms without flagella, slender forms poor in cytoplasm coloured red, with a dark nucleus (males), and large trypanosomes with a long nucleus and very pointed hinder end were also seen. In the proventriculus masses of trypanosomes were found massed together and indistinguishable from one another, chromatin inclusions also being numerous. No mention is made of the supposed harmless trypansome forms of Gray and Tulloch, specially described by Minchin, but from the description some of the forms described by Kleine would seem to be of this nature, and it is clear that a considerable amount of further work will be required to settle the identity or otherwise of these and other forms. It is interesting to note as regards treatment that arsenophenylglycin, a drug which is supposed to be far in advance of atoxyl or arsacetin and other compounds, has now been used on human subjects suffering from general paralysis of the insane without any untoward results, doses of 1 gram on two successive days (intramuscularly) having been given. Many will look forward with interest to its early trials in human trypanosomiasis, where, if as successful as it has been in animal therapeutics, much is to be hoped from it.

THE SEQUELAE OF MENINGITIS.

THE relative amount of success attained by vaccine treatment has brightened the prospect of curing cases of meningitis, but this hopeful view has been shadowed by the fear that although life may be saved, the brain will undergo such grave impairment of function that the prolongation of existence is a doubtful benefit. It is therefore satisfactory to read the account given by Dr. Leo Cohn[1] of the cases which survived from the epidemics of cerebro-spinal meningitis in 1905, 1906, and 1907, after treatment in the Municipal Hospital at Posen, where in each case the diagnosis was placed beyond question by the finding of meningococci in the cerebro-spinal fluid. Out of 82 patients 50 died, and of the 32 remaining the condition of only 27 could be investigated, as 3 had left the town and 2 had died—one from a condition having no relation to meningitis, and the other from hydrocephalus. Dr. Cohn divides these 27 cases into three classes: (1) Eight mild cases with short fever, slight general symptoms and rapid recovery; (2) fifteen cases of moderate severity, with longer fever marked by remissions; (3) four serious cases which had run a prolonged, variable, and complicated course. All the cases in the first category were children, and his examination showed them to be completely cured, their subsequent bodily and mental growth having been quite normal. The same may be said for a part of the second group even in the case of several children who on leaving hospital had paralysis of the limbs or ocular muscles. Of the others, among which were four adults, there were complaints of headaches coming on after exertion, stooping or straining; 3 complained of weakness of the limbs, and 3 adults had distinct impairment of memory, and in 2 there was diminished intelligence. One man, discharged as cured, presented, after a time, signs of hydrocephalus, weakness of the legs, intellectual torpor, syncopal attacks, and spasms of the left leg. Another case had paralysis with atrophy of the left arm and leg and loss of memory. A child, a year after the meningitis, exhibited a large hydrocephalus with idiocy, and, finally, a man had total sexual impotence, and two years later atrophy of the sexual organs. In the third group of 4 persons, 3 showed bilateral deafness; in 2 of these a coexisting facial paralysis had disappeared, but the loss of reflex nystagmus on the injection of hot water into the ear proved that the labyrinth was damaged, but as the function of equilibration was supplemented by other senses the deafness was the sole persistent clinical sign. The third child died a year later from diphtheria, and at the *post-mortem* examination nothing abnormal was seen, except adhesions of the dura mater to the anterior fontanelle and some thickenings of the pia mater, so that the anatomical cure was complete. The fourth child had suffered from a particularly grave attack, but presented clinically nothing abnormal, and seemed to have been completely cured. The conclusions Dr. Cohn draws are that in all light

[1] *Berlin. klin. Wochensch.*, January 11th, 1909.

cases there may be complete recovery from a clinical point of view, and that even in more severe cases this is possible, the probability being greater in children than in adults; in the latter traces of the disease may be noticeable two and half years after the attack. Hydrocephalus may come on as late as four weeks after apparent convalescence. The complication most to be feared is deafness, while all other paralyses may disappear, even rigidity of the pupils; deafness once established seems to be permanent. It is noteworthy that the agglutination of the blood serum with meningococci was in two cases positive after more than two years.

THE FREQUENCY OF TUBERCULOSIS IN CHILDHOOD.

NAEGELI'S observation that 97 per cent. of adults present evidence *post mortem* of tuberculous lesions in a latent or in an active condition showed that nearly everybody comes into contact with tubercle bacilli in the course of a few years, and that sooner or later the bacilli will attempt to invade the organism. In all the cases in which inactive localized foci alone were found, it may be assumed that the bacilli fought hard to get in, succeeded to some extent for a short time, and were destroyed by the protective power of the organism. Though these changes cannot be discovered by clinical examination, practically every tuberculous focus, no matter how small, reacts to tuberculin, so that the physician who diagnoses tuberculosis in this way has to include practically all Naegeli's adults. To get over the difficulty of the delicacy of this reagent, the ophthalmo-reaction, the cutaneous reaction and the like have been suggested; but is it justifiable to found a diagnosis on the sole evidence of a reaction to a reagent which has been shown to be too sensitive when it gets into the body? The altered method of application undoubtedly places some difficulty in the way of "getting in"; but a local reaction may take place, if the tubercle bacilli has manufactured products which persist after the decease of the bacilli themselves, and which, through the circulation, may reach the place where the tuberculin is applied? Statistics, which claim to show the frequency of tuberculosis in any decade of life, when the method employed is a modification of tuberculin application, must, therefore be received with caution. Drs. F. Hamburger and R. Monti, who have used the subcutaneous method alternatively with von Pirquet's cutaneous method, consider that the latter method does not reveal every case of active tuberculosis, and does indicate some inactive cases. They examined all children admitted into hospital suffering from acute infectious diseases, such as scarlatina, diphtheria, and cerebro-spinal meningitis, assuming that tuberculous children would not be more prone to catch these diseases than healthy children. The tests were applied by giving tuberculin by von Pirquet's method first. When a child reacted it was entered as tuberculous, while when a negative result was obtained a subcutaneous injection of from 0.1 to 1 mgr. of tuberculin was given. As only 23 of the children were under 1 year, this age-period was omitted on the ground of an insufficient number. Of 46 children in the 2nd year of life, 4 (9 per cent.) reacted, the proportion steadily increasing up to the 12th year, when it was 94 per cent. These statistics are not conclusive. The frequency may be as high as Drs. Hamburger and Monti put it; it could scarcely be higher, but evidence has been brought forward in recent times which tends to indicate that some of the invasions by tubercle bacilli end in a more or less powerful protection against the disease as such.

IT is stated in the *Times* that Dr. E. A. Wilson, of Cheltenham, who was second medical officer, zoologist, and artist in the *Discovery*, has accepted the post of medical officer to the Captain Scott expedition to the South Pole. Dr. Wilson did some zoological work among the penguins on the occasion of his former expedition, and published a volume through the Natural History Museum.

Medical Notes in Parliament.

The Poor Law Commission.—The Archbishop of Canterbury last week called attention to the report of this Commission in a valuable speech in the House of Lords. After a historical survey of the treatment of the poor before 1832, he considered the results of the present system. As figures for the earlier years were difficult of comparison he took 1871, and found that there were then 31 paupers per 1,000 of population as compared with 22 in 1908: but, considering all the varied methods of relief introduced of late years, the lessened figures gave little satisfaction. There were, he said, serious administrative defects, and there was an overlapping of existing authorities which often worked on different lines. One of the first remedies he suggested should be enlarged areas under one authority in order to obtain a fairly uniform system of outdoor relief—education, sanitary inspection, and the like—and the classification of the indoor poor in special institutions. He contended that the recommendations of the Majority and Minority Reports were not widely contradictory. The main recommendations made by the whole of the Commissioners were the enlargement of the area of administration, the abolition of the present boards of guardians as such, the ending of the system of *ad hoc* election to guardianship, and classification by institutions and not in institutions. All these hung together and were common to all. Again, both were in agreement in urging that the curative rather than the deterrent purpose should always be kept in mind. The reports diverged when they came to consider the authorities to be set up to do the work. The majority proposed that the powers and duties of the guardians should be transferred to statutory committees of the county and county borough councils working in co-operation with the existing committees established by law for cognate purposes—health, education, and so on—and that the manifold organizations that existed for the purpose of charitable aid should be correlated under authority and given a legal status in each of the new areas of administration. The minority of the Commissioners, on the other hand, proposed to distribute the powers and duties of boards of guardians in this way: so far as the non-able-bodied were concerned, they would be handed over to the existing committees of the county and county borough councils—for example, the existing education, health, asylums, and pensions committees. Their work was to be carried on under the supervision and control of registrars of public assistance, appointed by and responsible to the finance committees. The able-bodied were to be dealt with by a new organization, set up and controlled by the Board of Trade or a new Minister of Labour. Between these two he did not discriminate, though he confessed that he did not see how the existing authority, even if enlarged, could take over all these varied duties without bringing about another form of overlapping and a reversion to the small areas which every one condemned. For instance, there were now more than 1,800 different sanitary authorities in England and Wales—three times as many as boards of guardians. It was for the Government to decide which line they would adopt when they framed their bill. Lord Crewe thanked the Primate for his speech, and agreed with much that had been said. He thought the general sense of the urgency of the question was widespread, and that it could not be deferred. He admitted the gravity of the figures given, and pointed out that the number of paupers, though it had fallen after 1871 for

one cycle, had since risen ominously, while the cost of maintenance had nearly doubled. In 1871 the cost was almost 8 millions, in 1895–6 it was over 10 millions. and in 1905–6 it was upwards of 14 millions. He was glad attention had been called to the points of similarity between the two reports; there was a general agreement over the abolition of boards of guardians, on the abolition of the general workhouse, and mainly on the kind of classification to be adopted. Both reports agreed as to the necessity that in the last resort recourse must be had to compulsion in the treatment of certain cases of poor relief, and there were various other common grounds. It was true that there were certain differences of approach, but he thought he might say that the Majority Report in the main sought to develop individual responsibility, while the Minority Report tended towards giving a stimulus to the consciousness of social obligations. He hoped that it might be possible within a reasonable time to deal with this subject, vast as it undoubtedly was. The Bishop of Southwark made an earnest speech, appealing for an early consideration of the whole of the recommendations made by the Commission. The discussion then closed.

The Housing Bill occupied the Lords all day on Tuesday, and the Committee made several alterations in the bill. The most important was on Clause 2, in which, on the motion of Lord Camperdown, the plan of the Government for the acquisition of land for housing was rejected, and another and more deliberate method substituted. The plan of the Government was that adopted in the Small Holdings Act, and for it, after a long debate, the plan in the Port of London Act was carried on a division by 112 to 30. Lords St. Aldwyn, Alverstone, Salisbury, and Lansdowne supported the amendment, which was opposed by Lord Crewe and Lord Beauchamp. Clauses 3 to 7 were next passed, with a slight amendment in Clause 7 with regard to settled land. On Clause 10 an attempt was made to amend the bill by taking away the power of the Local Government Board to force a local authority to act by mandamus, but after a short discussion the amendment was withdrawn. An amendment was then accepted on the motion of Lord St. Aldwyn, which required the Local Government Board to be satisfied that the need for housing was likely to be permanent before declaring a local authority to be in default. Lord Midleton next moved an amendment requiring that an order of the Local Government Board under Part III should be laid before both Houses of Parliament for thirty days before taking effect. Lord Beauchamp objected to the amendment as causing serious and needless delay; Lord Lansdowne supported it on the ground that the Bill put too much power in the hands of a department, and on a division the alteration was carried by 72 to 24. Lord Midleton then moved to exclude from the scope of Clause 10, the London County Council or the Council of any County Borough, which was agreed to after a discussion. Clauses 10, 11, and 12 were then passed, and Clause 13 was amended as regards the incidence of housing charges. Clause 14 was altered by fixing the rental standard for rural districts of £8 instead of £16 after a division. On Clause 14 Lord Dartmouth moved a lengthy amendment, which the Government declined to accept as a whole, but agreed to put in a portion relating to the inspection of houses by the local authority or the landlord. The debate then stood adjourned.

The Admission of Women, Royal College of Surgeons.—Mr. Keir Hardie asked the Secretary of State for the Home Department whether he had received for sanction and ratification the new by-laws of the Council of the Royal College of Surgeons regarding the admission of women to their examinations, agreed to on April 1st last; whether he was aware that the delay in issuing the by-laws was causing inconvenience to women students waiting to go up for their examinations; and whether he could say when the by-laws were likely to be issued. Mr. Gladstone replied that he had already, on August 25th, signified to the council his decision to approve these by-laws. His approval would be given as soon as they submitted the formal document for his signature. He understood that they could not do this before their meeting on October 14th, but it would still, he believed, be possible to complete the necessary formalities in time for women to be allowed to enter for the examination of the Royal College to be held in January next.

Patent Medicine Labels.—Captain Craig asked the Home Secretary whether he would consider the advisability of issuing regulations making it compulsory on all manufacturers of medicines liable to Patent Medicine Duty to print on the label on the bottle, or other vessel in which such was sold, the full ingredients of such bottles or vessels, as well as the diseases they purported to cure; and whether he would consider the advisability of increasing the size of the lettering of the Government stamp as a further precaution against ignorant people believing that the contents were guaranteed by the Government. Mr. Gladstone said that he was in communication with the Privy Council Office about the point raised in the first part of the question, but he was disposed to think that the matter might be one of sufficient importance for an inquiry by a Select Committee next session. As regards the second part of the question, he was informed that new designs for medicine stamps had recently been adopted, and the printing plates were being prepared by the engravers. In the new designs it would be more clearly indicated that the stamp did not imply any Government guarantee.

Mortality in Transvaal Mines.—Last week Colonel Seely stated in answer to Mr. Markham that the following were the available figures of mortality from disease for Chinese and British Central Africa labourers on the Rand per 1,000 per annum: Chinese, 1905, approximately, 12; 1906, approximately, 11; 1907, approximately, 9; 1908, approximately, 7. British Central African: 1904–5, 118.3; 1905–6, 116.3; 1906–7, 52.8. In spite of the striking reduction in the death-rate of these British Central African natives from 116 to 52 per 1,000 in the last year mentioned, the Secretary of State did not feel justified in continuing to permit recruiting under official sanction. In answer to Sir Gilbert Parker on Monday last, Colonel Seely gave the following figures, which included the first quarter of 1909, namely:

(i) Death-rate from all causes per 1,000 per annum:

	1905.	1906.	1907.	1908.	1909.
Chinese ...	18	20	16	16	16
Natives ...	46	34	32	33	35

(ii) Death-rate from disease per 1,000 per annum:

	1905.	1906.	1907.	1908.	1909.
Chinese ...	12	11	9	8	6
Natives ...	41	29	27	29	28

(iii) Death-rate from accident, homicide, and suicide;

	1905.	1906.	1907.	1908.	1909.
Chinese ...	7	9	7	7	10
Natives ...	5	5	4	4	7

Plague and Rat Fleas.—Mr. Alfred King asked the Under Secretary for India last week whether the Indian Government still adhered to the theory that plague in man was due to bites of infected rat fleas; and, if they did not, what theory were they acting on, and had they made such changes in their administration as were necessary to meet the new situation? The Master of Elibank replied that the connexion between bubonic plague in man and plague in rats was well established, and rat destruction continued to hold a prominent place among the preventive measures adopted by the Government of India. As he had already stated in reply to a question the steps taken to prevent plague had been published through the Moral and Material Progress Report and other publications. Besides these special measures, the Government of India were now considering an important scheme for the improvement of the sanitary service. In reply to a further question, he said that he had not seen a statement in the public press to the effect that the rat flea theory was disproved. A well-known medical

authority who had taken up an independent attitude on this question did not generally agree that this theory had been disproved.

Factory Surgeon (Hull District).—Mr. W. Thorne asked the Home Secretary if he was aware that the permanently-appointed factory surgeon for the Hull district was a medical man in connexion with the sick club at the firm of Messrs. Blundell, Spence, and Company, Hull; whether the Government allowed the permanently-appointed factory surgeons to act as medical examiners to sick clubs for private firms; and whether he intended taking action in the matter. Mr. Gladstone replied that he had no information as to whether the certifying surgeon at Hull was connected with the sick club referred to, but it was a very usual thing for certifying surgeons to be connected with clubs under the management either of employers or of workmen, and in some districts it would be difficult to find a doctor who was not so connected. If there was any allegation of grievance in this particular case he should be happy to make inquiry on receiving a statement of the details.

Lady Medical Missionaries in Madagascar.—Sir Gilbert Parker asked the Secretary of State for Foreign Affairs whether lady medical missionaries, fully qualified, and one of whom held a gold medal given in 1895 by the French Government for her care of the wounded, had been forbidden to give out medicine to the natives in Madagascar under pain of legal proceedings; and whether this Government had made any representations on the subject to the French authorities. Sir Edward Grey replied that he was not aware of the circumstances referred to. The question of the qualification of foreigners to practise medicine in France or her colonies was governed by French law, according to which no one was allowed to practise medicine in France or in French colonies without a diploma of medicine given by the French Government, subject to certain conditions.

Antivaccination Declarations.—Sir Maurice Levy asked the President of the Local Government Board whether he would give instructions to vaccination officers to accept declarations under the Vaccination Act, 1907, made by mothers in the absence of their husbands at sea or anywhere where they were unable to make the declaration. Mr. Burns replied that the law officers advised in 1898 that under ordinary circumstances the father was the person to obtain a certificate of conscientious objection, and a similar view would no doubt apply to the making of a statutory declaration under the Vaccination Act, 1907. A declaration made by the mother would not relieve the father from liability. It would, however, relieve her from liability, and for this purpose it should be accepted by the vaccination officer. Where it had appeared to him necessary, he had informed the vaccination officer to this effect. It did not seem to be necessary to make any general communication on the subject.

Amendment of the Inebriates Act.—Mr. Gladstone stated on Monday last that he hoped to introduce a bill on this subject next session.

British Army and Small-pox.—On Monday last, in answer to Sir F. Channing, Mr. Haldane submitted the following table showing the average strength of the British troops serving at home and abroad during the years 1888 to 1908, also the admissions and deaths with the percentage to strength, and the percentage of mortality to attack, for small-pox amongst the troops serving in the United Kingdom, India, Egypt, and the Colonies, during the years 1888 to 1905, inclusive:—

Small-pox in the British Army.

Year.	Average Strength.	United Kingdom.					India.					Egypt.					Colonies.*				
		Admissions.	Deaths.	Percentage		Percentage of Mortality to Attack.	Admissions.	Deaths.	Percentage.		Percentage of Mortality to Attack.	Admissions.	Deaths.	Percentage.		Percentage of Mortality to Attack.	Admissions.	Deaths.	Percentage.		Percentage of Mortality to Attack.
				Admissions.	Deaths.				Admissions.	Deaths.				Admissions.	Deaths.				Admissions.	Deaths.	
1888	198,851	14	1	.01	.00	7.14	107	10	.16	01	9.35	14	4	.42	.12	28.57	4	—	.02	—	—
1889	198,446	2	—	.00	—	—	152	17	.22	.02	11.18	42	6	1 22	.17	14.29	5	—	.02	—	—
1890	196,502	—	—	—	—	—	36	4	.05	.00	11.11	—	—	—	—	—	—	—	—	—	—
1891	196,270	1	—	.00	—	—	14	1	.02	.00	7.14	1	—	.03	—	—	4	—	.02	—	—
1892	199,049	6	—	.01	—	—	18	3	.03	.00	16.67	2	—	.06	—	—	—	—	—	—	—
1893	202,125	8	—	.01	—	—	33	4	.05	.01	12.12	4	—	.08	—	—	5	—	.02	—	—
1894	203,469	11	—	.01	—	—	13	3	.02	.00	23.08	—	—	—	—	—	2	—	.01	—	—
1895	200,681	3	—	.00	—	—	19	2	.03	.00	10.53	5	—	.11	—	—	—	—	—	—	—
1896	203,145	1	—	.00	—	—	122	10	.17	.01	8.20	2	—	.05	—	—	—	—	—	—	—
1897	198,29[illegible]	—	—	—	—	—	24	4	.04	.01	16.67	3	1	.07	.02	33.33	4	—	.01	—	—
1898	202,166	—	—	—	—	—	2	—	.00	—	—	—	—	—	—	—	2	1	.01	.00	50.00
1899	201,004†	1	—	.00	—	—	14	1	.02	.00	7.14	2	—	.05	—	—	1	—	.00	—	—
1900	226,276†	1	—	.00	—	—	36	3	.06	.01	8.33	3	—	.08	—	—	5	—	.02	—	—
1901	196,796†	6	1	.01	.00	16.67	20	3	.03	.01	15.00	—	—	—	—	—	4	—	.02	—	—
1902	254,357†	11	3	.01	.00	27.27	23	4	.04	.01	17 39	—	—	—	—	—	3	—	.00	—	—
1903	242,182	2	—	.00	—	—	68	8	.10	.01	11.76	1	1	.02	.02	100.00	1	—	.00	—	—
1904	244,425	3	—	.00	—	—	49	5	.07	.01	10.20	2	—	.04	—	—	2	—	.00	—	—
1905	240,075	—	—	—	—	—	99	1	.14	.00	1.01	—	—	—	—	—	7	—	.02	—	—
1906	230,128	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1907	217,844	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1908	215,467	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Includes Gibraltar, Malta, Cyprus, Canada, Bermuda, Barbados, Jamaica, Western Africa, South Africa, St. Helena, Mauritius, Ceylon, South China, North China, Straits Settlements, and Crete.

† Does not include troops in South Africa serving during the late campaign.

Scotland.

[FROM OUR SPECIAL CORRESPONDENTS]

ABERDEEN.

Medical Inspection of School Children.

AN important meeting of representatives of 87 out of the 91 school boards in Aberdeenshire, along with the members of the County Committee on Secondary Education, was held at Aberdeen on September 18th for the purpose of considering a scheme for the medical examination and supervision of the school children in the county. The scheme, which had been drawn up by the County Committee on Secondary Education, proposed that for the purposes of medical examination and supervision the county, including the burghs, should be treated as one area. It proposed to appoint a principal school medical officer to have charge of the whole scheme at a salary of £300 per annum, rising by annual increments of £25 to £400 per annum, with necessary travelling expenses; and an assistant school medical officer for the county at a salary of £200, rising to £300, and with the necessary travelling expenses; district nurses to be employed to assist the school medical officers, the sum of £200 to be allocated for the current year for the payment of such nurses, either by subscription to district nursing associations, or otherwise, as might be arranged. Necessary clerical assistance and office accommodation, printing and stationery, is estimated to cost £200; and each school is to be provided with a weighing machine and a measuring rod. The total cost for the first year is estimated to be £2,050, half of which would fall to be allocated amongst the several boards in proportion to the average number of pupils on the rolls of the schools.

The scheme was subjected to a good deal of criticism, and the conference was adjourned for three weeks to enable the representatives to get a mandate for or against the scheme, so that a decision on the scheme might be arrived at.

Newhills Convalescent Home and Sanatorium.

While we hear in the present day of enormous sums being expended on the construction of convalescent homes and sanatoriums it is interesting to note the progress of the Newhills Convalescent Home, which, from a small beginning, has now assumed large proportions. Mrs. Smith (wife of the parish minister), Newhills, Aberdeenshire, began to interest herself in the Home thirty-five years ago. At that time, for a rental of £5 a year, she took a small cottage which had only accommodation for two or three patients. The work was continued for about eight years, when the cottage became too small, and was getting into rather a dilapidated condition. Mrs. Smith then took steps to have another cottage built on the top of the hill, surrounded by pine woods, and commanding an excellent view. A few years after the present cottage was built it became too small, and it was enlarged so much that it can now accommodate 26 patients. Mrs. Smith found, after this new cottage had been built, and before the present movement for dealing with phthisis arose, that there were always a few consumptives applying for admission, and she set aside part of the new cottage home when it was enlarged—one room for men and another for women—for the special benefit of such patients. The results proved so satisfactory that when the newer ideas about open-air treatment of phthisis came into vogue, and the infectious nature of the disease to be understood, she took steps to have a small separate sanatorium built in connexion with the Cottage Home, the intention being to exclude phthisical patients from the convalescent home, and to give such patients the benefit of open-air treatment and special dieting. The consumptive block, which has accommodation for 13 patients, was erected on the footing that, if it should be ultimately superseded by suitable hospitals on an adequate scale for Aberdeen and district, it could then form part of the convalescent home. Of late years the number of those applying for admission has greatly increased, and those in charge hope that means will soon be provided to extend the work. The institution has always been managed with the utmost economy, although there is no stint of excellent food; and it reflects great credit upon the management that the average expenditure per patient, inclusive, does not exceed 10s. a week.

Reference has been made to this home at some length with the object of showing that from small beginnings and capable management much can be done in the building up of an institution such as this one. Mrs. Smith worked the home single-handed until a short time ago, when a committee was formed to manage it. Following her example, cottage homes have been opened at Maryculter and at Culter; they supply a much-felt want, many poor people from the towns getting a chance of fresh air and good food and rest, thus preventing in many cases a premature breakdown.

GLASGOW.

Medical School Extension.

About a year ago a report on the provision of facilities for the extension of medical teaching in Glasgow was approved generally by the University Court and by the Senate. The matter was referred to a committee, which has been conducting negotiations with the managers of the Royal and Western Infirmaries and of St. Mungo's College, with the Muirhead Trustees, and indirectly with the Carnegie Trustees. What is aimed at is the establishment of university chairs at the Royal Infirmary for the teaching of (1) medicine and clinical medicine, (2) surgery and clinical surgery, (3) midwifery, and (4) pathology. It is proposed that these four professors should form the teaching staff so far as the Royal Infirmary is concerned. Under this arrangement in place of a complete there would be a partial medical school at the Royal Infirmary, so that university students, if they preferred, might take their final year at that institution instead of at the Western Infirmary and Gilmorehill.

Towards the accomplishment of this object it is understood that the Muirhead Trustees are willing to give two sums of £400 a year each to found two of the chairs, that the funds of St. Mungo's College are to be concentrated on one chair, and that the Carnegie Trustees are to supply the funds for the fourth chair. The scheme will require to be sanctioned by Parliament, and draft provisional orders for that purpose are being prepared. These will be submitted to the members of the University Court for their approval, probably at a meeting in October.

Consumption of Milk in Glasgow and Edinburgh.

Some interesting figures regarding the proportion of milk consumed in various towns were brought forward in the presidential address at the autumn conference of the Federation of Dairymen's and Cowkeepers' Association of the United Kingdom, held in Dublin on August 24th. While Dublin consumed 6½ oz. a head and Manchester 4½ oz., Glasgow and Edinburgh used each 10 oz. a head. The advantages of milk were dwelt upon, and mention was made of the theory of Dr. E. C. Latham, who maintained that the desire for strong drink might be overcome without the aid of drugs or "cures," and simply by the use of buttermilk. It was possible, Dr. Latham said, to subdue and finally destroy the desire for alcoholic stimulants by drinking from 3 to 6 oz. of buttermilk whenever the desire for intoxicants manifested itself.

Education, Industrial Diseases, and the Compensation Act.

Sir Thomas Oliver, of Newcastle, delivered an address in the new waiting hall of the Glasgow Royal Infirmary on September 1st in connexion with the opening of the post-graduate course of studies at that institution. Sir Thomas spoke on modern moods and movements in medicine. There were few cities, he said, that offered the wealth of clinical material that was to be found in Glasgow, and it was pleasing to find that the movement for post-graduate studies should have been taken up in that city. It was of the utmost importance to the medical man that he should keep abreast of the times, and to do this it was necessary that he should be continually building on the foundation of knowledge gained in his studies at college. The effects of post-graduate study did not concern only those who took part in it, but was of the greatest good to the people generally. It had hitherto been a well founded complaint that in medicine there were few salaried appointments compared with those in law, but recently the sphere of practical medicine had been widened by the State. The rise of the factory system, the nation's care

for the common health, and the medical inspection of school children had opened up careers for numbers of the medical profession, and brought medicine into touch with social problems in a manner until recently undreamt of. One unsatisfactory aspect of our educational system was seen in the absence of any attempt to deal personally with the mental and physical disabilities of the children. All were treated alike, with the result that the brilliant were pushed ahead, and the dull lagged behind. It was never thought that some of the dullness might be due to defective sight or hearing, or be the result of adenoids or impaired health. There was excellent reason and room for remedying all this; the present amount of educational waste was astounding, and showed how faulty our system had been. The trend of modern days was in the direction of the prevention of disease. Since there were millions of men and women in the country who were spending many hours daily in factories, amid surroundings that made for ill-health, the study of industrial diseases and the conditions which caused them, would in the future become more and more a national requirement. Then a larger place would have to be assigned to the study of such problems in the medical curriculum. The diagnosis and treatment of industrial disease might with some advantage find a place in a course of post-graduate instruction. Parliament had imposed new duties on the physician, in regard to which there should be some special training. The operations of the Workmen's Compensation Act were bringing medical men into conflict with one another, with their patients, and with employers. Human life had, by Act of Parliament, a money value properly assigned to it in the case of accidents, and upon the medical man devolved the task of guarding the interests of employer and employed alike. Sir Thomas said that it was an unfortunate circumstance that the Act had brought into evidence a class of lawyer and medical practitioner whose behaviour was creditable neither to themselves nor to the professions to which they belonged. There were lawyers who on unmistakably insufficient grounds urged men and women to proceed to law to recover for imagined effects of injuries, and there were medical men who stooped to similar methods. It was not right to question the motives of others, but unless a medical man was thoroughly convinced of the reality of an illness, and that it was a proper basis of a claim for compensation under the Act, he should not advise a case being taken into court.

School for Defective Children in Wishaw.

At a meeting of the Cambusnethan School Board at Wishaw it was agreed to erect a school for the education of defective children in the parish. The building will be a composite one, consisting of two class-rooms, a teachers' room, a hall, a kitchen, and other conveniences, and will cost, approximately, £800, including fittings and apparatus. The estimated cost of driving the children (about fifty in number) to school is about £150 a year. This will be one of the first, if not the first, schools specially built for the education of mentally defective children in Scotland.

Perth.

A special meeting of the subscribers and contributors to the Perth City and County Royal Infirmary was held at Perth on September 6th to consider a recommendation by the directors as to the adoption of a site for a new infirmary. The report by the directors was submitted, in which they recommended as the most suitable site a plot of ground at Tullylumb, lying to the south of Western Avenue, Glasgow Road, containing a little over eleven acres. A sketch plan, prepared by Mr. James Millar, architect, Glasgow, showed a modern hospital thoroughly up to date, with 120 beds at an estimated cost of £36,800. On the motion of the Chairman, Mr. C. A. Murray, the meeting approved of the site, authorized the directors to acquire it, and to take such action as they may see fit to mature the scheme for a new infirmary.

Scottish Vital Statistics for 1907.

The most salient features of the Scottish vital statistics for 1907, which have just been issued in Blue Book form, are a continued fall in the birth-rate, the birth-rate of the year being the lowest yet recorded, a marriage-rate of average amount, and a death-rate which, though slightly higher than those of the two previous years, 1905 and 1906, is less than those of all other previous years since the institution of national registration. The infantile mortality-rate of 1907 was low. It is less than the corresponding rates of all the years since 1879. The slight increase of the death-rate of the year over those of the two previous years may be ascribed to the existence of an epidemic in Scotland of cerebro-spinal meningitis. Compared with the estimated population of the previous year, those of each of the urban districts show an increase, while those of each of the rural districts show a decrease.

Women's Voluntary Detachments.

Lieutenant-Colonel Barnes, Convener, and Miss I. Hamilton M'Ilroy, M.B., interim Secretary of the Scottish Women's Red Cross Brigade of St. Andrew's Ambulance Corps, have issued a circular letter in the following terms:

It has recently been decided by the War Office and the British Red Cross Society in conference that voluntary aid detachments of both men and women shall be formed in connexion with the county territorial associations to fill the gap left in the medical arrangements for the field army of defence. Under these circumstances there will be no necessity for the proposed Scottish Women's Red Cross Brigade of the St. Andrew's Ambulance Corps, and its establishment would indeed lead to the very overlapping and waste of effort we are anxious to avoid. It has, therefore, been decided not to proceed further with its organization. In intimating the same to those concerned, the thanks of the Association are tendered to all who have gone to considerable trouble in the matter. No doubt those who contemplated joining the proposed brigade will have an opportunity of offering their services to the voluntary aid detachments of their several counties when formed.

Results of Medical Examination of School Children.

Dumbarton School Board was one of the first boards to decide upon the medical examination of school children, and the first report deals with one school—College Street—where 654 children (339 boys and 315 girls) were examined. The parents offered objections in 5 per cent. of the cases. It was ascertained from the children what illnesses they had previously suffered from, and the highest percentages of illnesses were discovered to have been—Measles, 67.5; whooping-cough, 39.4; chicken-pox, 16.3; scarlet fever, 10. One important finding was that, gauged by the figures of the Anthropometric Commission of the British Association, the Dumbarton children, while little divergent in height, were 4.13 lb. under the average weight for British children and 5 lb. below those of Aberdeen. Dr. Little, the reporter, makes out from these figures that Dumbarton children require more nutrition, and suggests a tentative experimental feeding of a group of local pupils. Dr. Little also maintains that an immediate improvement in the general health of the children would follow the appointment of a medical officer for the schools.

England and Wales.

[FROM OUR SPECIAL CORRESPONDENTS.]

WALES.

Cardiff Medical School.

At a meeting, held on September 15th, of the Cardiff Infirmary Board of Management, Colonel Bruce-Vaughan said he wished to offer hearty congratulations to the University of Wales on the additional grant of £15,000 a year from the Treasury, and more particularly on the allocation of the grant of £1,500 for the Cardiff Medical School. The welfare of the college, whose professors had done and still were doing so much for the infirmary, must deeply concern that institution. He hoped that by private benefactions and adequate further support from the Treasury the Cardiff University College would be able to complete its fine scheme of buildings and maintain them, and pay its professors and lecturers stipends worthy of its position as the chief college of the Principality. The progress made by the Cardiff Infirmary in the last few years from a building point of view, and the excellence of its staff, had contributed in no small degree to the allocation of the grant to a medical school. Dr. MacAlister, one of Sir Thomas Rayleigh's Committee, who paid a visit to the Cardiff Infirmary last year, laid special stress on

the provision for clinics in the new out-patient department, and the efficiency of every other department of the hospital. He was also informed of the intention of the board immediately to add 78 beds, which would make a total of 168, also to add another operating theatre, with the provision of laboratories to the old and new ones and the building of a well-equipped pathological block. These details connected with the infirmary and Dr. MacAlister's observations on the great possibilities of Cardiff as a school of science had undoubtedly led to the recommendation of his committee of this grant. Probably the first step which would be made by the council of the college would be the appointment of a professor of pathology. The advantage to the infirmary staff of such an appointment and the benefit to the whole community would be great indeed. They had made provision for this appointment by including in the new wing scheme the provision of buildings which would cost, including equipment, £4,600. The infirmary had done something, then, to facilitate the appointment of a professor of pathology. It was hoped to make this appointment as speedily as possible. The foundation of a medical school meant much for Cardiff, the Principality, and the infirmary, and he asked them to offer to the council of the college the use of rooms for its professor of pathology whenever he might be appointed, and to congratulate all those gentlemen who had been instrumental in laying the foundation of a Cardiff Medical School. Colonel Vaughan's suggestion was supported by Dr. T. Wallace and unanimously agreed to.

NEW WING OF THE CARDIFF INFIRMARY.

At the ordinary monthly meeting of the Board of Management of Cardiff Infirmary held on September 16th a vote of condolence was passed with Mr. John Cory on the death of Mrs. Cory, and with Mr. Richard Cory on the death of his son. The Chairman (Colonel Bruce-Vaughan) announced the receipt of a communication from Sir W. T. Lewis to the effect that Mrs. John Nixon would lay the foundation-stone of the new wing on October 21st at 3 o'clock. The addition, costing £33,000, to which Mrs. Nixon has generously contributed 10,000 guineas, is in memory of her late husband, Mr. J. Nixon (Nixon's Navigation Colliery).

The financial statement referred to an overdraft of £21,160 19s. 11d., and in discussion Mrs. Henry Lewis of Greenmeadow sounded a note of warning as to the probable effect of the Budget, which bore hardly upon many, as they heard over and over again. The Chairman said this was an important question, and they must do their utmost to cope with it. There are 633 patients waiting admission, because the institution is too small and the income insufficient. Madame Patti and the artistes who assisted were cordially thanked for their services at the recent concert in aid of the infirmary funds, and thanks were conveyed to Dr. Howell Rees, through whose instrumentality Madame Patti came to Cardiff once again.

MERTHYR HOUSING.

The housing problem is ever present in Merthyr, and the Borough Council has considerable difficulty in dealing with it. At every meeting of the Health Committee the medical officer of health, Dr. Duncan, recommends the closing of certain houses unfit for human habitation, but this step is opposed by many of the members on the ground that no provision is made for the displaced population. Instances are also on record where houses which have been condemned are still occupied, owing to the tenants, after careful and continuous inquiry, being unable to find other houses. Dr. Spencer Low, in his report in 1906 to the Local Government Board on the sanitary condition and administration of Merthyr Tydfil, stated that there could be no question as to the chief want of Merthyr—it was more abundant and better dwellings available for the working class population. Since 1906 a large number of workmen's dwellings have been erected by the Borough Council and by private enterprise, but the building of new houses does not seem to keep pace with the closing of condemned premises. In the years 1906, 1907, and 1908, 611 houses were built in various parts of the borough by private enterprise. About seven years ago the Borough Council erected 100 houses for workmen at Penydarren In 1907, 38 were built at Penywern; and in 1908, 50 at Twynyrodin. Others are being erected at Danyderi, and these will be completed in a few months. A contract has also been accepted for the erection of 68 houses at Penywern, and a portion of the land purchased at Gellifaelog has been set apart for the building of workmen's dwellings, and the deputy surveyor has already presented a scheme for 200 cheap houses for the very poor. There still remains, however, acording to the latest report of Dr. Duncan, a considerable amount of insanitary property in the borough, and the council is faced with the difficulty of a dearth of houses, especially of houses with a rent sufficiently low to suit the case of tenants who would have been displaced from slum areas. For this reason certain areas have not been dealt with. That the Borough Council is doing its best is certain, but one of the greatest difficulties that this body has to contend with is the difficulty of getting land to build upon, as some ground landlords do not seem disposed to sell sites for building purposes, and the solicitors for one estate, when applied to, replied:

> We are sorry to say that the housing scheme of the Council does not seem to the landowners to be of any advantage to their estate, and, in fact, if agreed to, might result in their being unable to sell any more land to private builders, except on remarkably low terms, and therefore it is not worth while to further consider the proposal.

This communication was severely commented upon by members of the Council, and it was resolved to send copies to the Chancellor of the Exchequer, the President of the Board of Trade, and the local members of Parliament. The question was recently raised in the House of Commons, and Mr. John Burns, in reply, said that local authorities were already empowered by Section 57 of the Housing of the Working Classes Act, 1890, to apply to the Local Government Board to enable them to purchase lands compulsorily for the purpose of providing houses for the working classes, and he added that under the Housing and Town Planning Bill now before Parliament the procedure in relation to this matter is proposed to be carefully simplified and improved.

SANITARY INSPECTORS' ASSOCIATION.

The annual meeting of the South Wales and Monmouthshire Centre of the Sanitary Inspectors' Association was held at the Cawdor Hotel, Newcastle-Emlyn, on September 10th. Representatives from Glamorganshire, Monmouthshire, Carmarthenshire, and Cardiganshire were present, and these were met by Mr. John Bowen, Llwyneinon, the Chairman of the Council of the Association. After luncheon and the usual toasts business was commenced; in the unavoidable absence of the President, Dr. W. Williams, the chair was taken by Dr. J. Powell, among those present being Drs. D. G. Lloyd, D. L. Thomas (M.O.H. Stepney), and D. J. Thomas (M.O.H. Acton), and the clerk and surveyor to the Newcastle-Emlyn District Council. Dr. Lloyd, in an excellent paper on "Consumption, its Causes and Prevention," dwelt upon the exceedingly high death-rate in his district from consumption. It was higher, he said, than in the worst districts of London. During the last century sixteen millions more succumbed to consumption than were killed in the wars. About twenty-five years ago the following could well be written over the doors of an establishment allotted for the receipt of consumptives: "All hope abandon, ye who enter here." To-day the more encouraging words, "Cure sometimes, and relief always" might be substituted. One step in the right direction was taken by Mr. John Burns in his Town Planning Bill. Dr. Powell, in thanking his colleague for his admirable paper, stated that he had always thought highly of him, but after hearing the paper he had enhanced himself immensely in his sight. Dr. D. J. Thomas, Acton, said he was dissatisfied with voluntary notification. There were two reasons for the failure of sanatoriums: one was that they could not get people in early enough, the other being the fact that at the sanatorium they were not taught any new occupation. When they got out of the institution they had nothing to do but to fall back upon their old occupations, and live under the same old conditions. Consumption was entirely different from scarlet fever and diphtheria. When they were cured from the latter they were far less likely to get second attacks, but consumption, although the patient was cured, would break out again under unhealthy conditions. The sanatorium

would do an immense good in educating the parents. A large number of persons who were now suffering were undoubtedly emigrants from the towns with a view of obtaining a cure or relief amid healthier surroundings. Dr. D. L. Thomas (Stepney) totally disagreed with what his brother said regarding consumption in Cardiganshire. Ten years ago he made inquiries into the death-rate in South Wales, and he found that—compared with that unsavoury district, Whitechapel, with its 58,000 inhabitants—consumption was most rife in Cardiganshire, with its mountain air and Atlantic breezes. Dr. Powell thanked the medical gentlemen for their excellent contributions. After the usual votes of thanks were passed, Dr. W. Williams, county medical officer for Glamorgan, was unanimously re-elected president of the centre for the forthcoming year, whilst Mr. Orlidge (Panteg) was appointed chairman of the council and Mr. D. T. Williams, county inspector for Glamorgan, vice-chairman, and Mr. J. Towy Thomas, chief sanitary inspector Rhondda, as secretary of the centre.

Mr. E. J. Evatt.

Mr. Evelyn John Evatt, M.B., B.S., who for several years past has been a member of the staff of the University College of South Wales and Monmouthshire as lecturer in applied anatomy and assistant lecturer and demonstrator in anatomy, has been appointed Professor of Anatomy in the University of Winnipeg, Canada.

BRISTOL.

The Handel Cossham Memorial Hospital.

The Handel Cossham Memorial Hospital, after being open for a brief eighteen months, has now been closed for six months. The ostensible reason for this step was the occurrence of a case of haemorrhagic small-pox, which was followed by several cases among the staff and patients. This, however, really gave the committee the opportunity that they had long wished for, to close the hospital in order to get their affairs in order. It will be remembered that the late Mr. Cossham left about £150,000 to found a hospital in the neighbourhood of Kingswood, an outlying part of Bristol, with which he had long been connected in business. Of this large sum the committee spent about £50,000 in erecting a hospital built in the best modern style and fitted with all the requisites needed for the treatment of patients in a general hospital, leaving the balance invested to produce an income sufficient to maintain 52 beds. After eighteen months the committee find that they are in debt to the amount of £3,000, and the incident referred to above formed an adequate excuse to close the hospital and allow the income to be spent in the payment of the debt that had accumulated.

Under the rules three members of the committee are appointed by the City Council, and on September 15th the appointment of three "representative trustees," as they are called, came before the Council, and led to an interesting discussion. Alderman Hare, after remarking that the hospital was an asset to the city, said that he could not help feeling that there was a great deal wanting to make it a useful adjunct to Bristol. He thought the Council would be surprised at some figures that he could supply—one, for instance, that the cost per bed was £150, whereas at the Infirmary or the General Hospital the cost was one-half that amount, while it was further proposed to spend £2,300 on occupying twenty beds, as the committee suggested opening again with only twenty beds. The discussion was continued by Dr. Christy, who referred to the fact that the patients had to go before the trustees to obtain admission, and suggested that there had been extravagance in the building and fittings, instancing a clock that was said to have cost £450. Mr. Britton, a member of the committee, said the committee had a complete answer. It was due to the medical experts that the hospital had been built in such an extravagant way, and they were advised by them that the income was sufficient. The hospital would never be managed except at a higher rate of expenditure. Alderman Swaish, another member of the committee, said that there had been some friction with the doctors, and the question was whether the committee or the staff should manage the institution. The committee had tried to meet the views of the staff, but they were not prepared to hand over the hospital to the doctors. The clock cost £36. The theatre had been a very heavy expense, for they had made provision for the performance of expensive operations, and, as a result, their expenditure was vastly increased. In reply to a question, Mr. Swaish avoided saying how many beds the committee proposed to open, but assured the Council that they could rely on the hospital being used to the fullest extent. Mr. Perry asked if it was true that £985 per annum were spent on salaries, and £506 on sundries, out of an income of £2,200, and Alderman Swaish said those figures must be wrong.

It is evident from this report that some dissatisfaction exists about the affairs of the hospital, and no very adequate assurance was given by the members of the committee that matters were going to be bettered in the future. If it is finally determined to open the hospital with only twenty or at the most thirty beds, with no resident house-surgeon and not to admit any acute cases, as, it is rumoured, is the intention of the committee, it would not be worth the while of any medical man to give his time and skill to what will, when all is said, be nothing more than a convalescent home. It is more than doubtful whether Mr. Handel Cossham contemplated his legacy being used for such a purpose. The truth would seem to be that the committee embarked on a scheme the details of which they were quite ignorant, and when they find that they have got heavily into debt they try to throw the blame on their medical expert—who happens to be out of England—and on the staff, with whom they say that they have had friction. The friction that arose with the staff was due to the fact that the committee had little experience of the ordinary way in which medical charities are managed, and when the staff, pointed out that their actions were unusual they were not only snubbed, but their letters were unanswered and their grievances ignored. To try to cast the responsibility of the present state of affairs on the staff is unfair and ungenerous, as the staff were not allowed to be members of the committee and they were present at its meeting only on sufferance.

MANCHESTER AND DISTRICT.

St. Mary's Hospital.

A valuable report on the clinical work of the maternity department of the St. Mary's Hospital, Manchester, has just been issued. The report is prepared by Dr. Fletcher Shaw, late resident surgical officer, and is approved by the Medical Committee. During the year 1908 the hospital has treated 3,735 maternity patients, 3,301 at their own homes and 434 in the wards. This is an increase of 358 over the previous year, but is much below the numbers in former years, the area served by the hospital being restricted and the beds for maternity patients being kept at twenty owing to lack of funds. On account of the small number of beds, multiparae are not admitted unless for some complication. Thirty-eight medical students and 59 pupil midwives received their training during the year, and seven qualified medical men attended the practice of the hospital. According to the new regulations of the Manchester University all candidates for the degree must now spend three months in a maternity hospital, while the pupil midwives, as formerly, stay four months. About 800 patients were attended at their own homes by the resident staff for complications, and of this number 41 were brought into hospital, but many cases suitable for admission had to be attended outside. Seventeen patients died in the wards during the year. This may seem to be a high mortality for the 434 patients admitted, but it is due to the fact that all the serious cases in the large home district are transferred to hospital. The mortality thus represents that of the whole maternity department. Many serious cases also are sent in by outside practitioners or midwives, often after attempts at delivery have failed. Probably one of the most beneficent acts of the hospital is to admit those serious cases from outlying districts, and no one is refused if room can possibly be made. As reports of maternity hospitals are naturally compared, it is only fair to make the peculiar position of this hospital quite clear.

The total morbidity, using the standard recommended in the Journal for May 19th, 1906, amounted to 16.8 per

cent. Here again the character of the work done needs to be taken into account. There is a home patient district of 3,301 patients, and the hospital has only 20 beds. An attempt is made to admit all home patients who require interference, so that the beds are seldom occupied by normal cases. Thus of necessity the morbidity is high, and not fairly comparable with that in hospitals that admit a large proportion of normal cases. The total number of cases of morbidity was 73; a morbid rise of temperature occurred in 62 cases, of which only four were normal deliveries, 26 were sent in by outside doctors after attempts at delivery, and 16 were after Caesarean section, most of which had a slight rise of temperature sufficient to bring them into the morbidity list. Of the 62 cases in which pyrexia occurred, active measures were required in only 18, blunt curettage being done, followed by gauze packing, and all made good recovery.

The report gives full details of all the abnormal cases dealt with. Breech presentation occurred in 15 cases, with 5 infant deaths, but some abnormality was present in every case, apart from the presentation. Persistent occipito-posterior presentation occurred in 6 cases, all of which were treated by manual rotation and extraction by forceps. Placenta praevia occurred in 29 cases, of which 26 were multiparae, and three mothers died, while 21 infants were stillborn. This is an infant mortality of 72.4 per cent., but only 3 of the infants were at full term. The treatment in 12 of these cases was dilatation and rapid delivery, while version was used in 6 cases, natural delivery occurred in 6, labour was brought on with bougies in 3, and spontaneous evolution occurred in 1. It is noted that all these modes of delivery gave bad results as far as the infants were concerned, but only 5 were at full term, the remainder varying from twenty to thirty-six weeks. Twelve patients were admitted for accidental haemorrhage, 11 apparent and 1 concealed; none of the infants was born alive, but of the mothers only the one with concealed haemorrhage died. Only 4 cases lost sufficient blood to warrant the term "*post-partum* haemorrhage," and the haemorrhage ceased after the use of hot intrauterine douche and ergot. Seventy-one cases of contracted pelvis were treated. Of these, 14 were delivered naturally, 15 required forceps, premature labour was induced in 11, the method used being to insert two sterilized bougies between the membranes and the uterine wall after careful cleansing of the vulva and vagina. In 23 cases Caesarean section was performed, with 3 deaths of the mothers, but in each case of death attempts to deliver had been made before admission, and all died of septic infection, showing the gravity of the operation after attempts at forceps delivery. Craniotomy was needed in 9 cases, all of which did well, but it is stated that "now that Caesarean section is attended with such slight risk to the mother, craniotomy should be seldom necessary, but, unfortunately, attempts at delivery are often made in contracted pelvis before sending them into hospital," and this greatly increases the risk. Out of the 341 deliveries in hospital, forceps were used in 38 cases, with 12 deaths of the infants and 2 of the mothers, 1 dying of eclampsia, and the other being a case of after-coming head. Internal cephalic version was done 3 times and internal podalic version 21 times. Two patients were admitted with rupture of the uterus, and one occurred spontaneously in the wards; all made good recoveries, two being treated with gauze packing and hysterectomy being done in the third. Twelve patients were treated for albuminuria of pregnancy, being kept in bed on a milk diet with a diaphoretic and diuretic mixture; all were discharged in good condition, though in 5 a small amount of albumen persisted. This contrasts with the experience of eclampsia, where albumen generally disappears a few days after delivery. Fourteen cases of eclampsia were admitted, of whom 5 died, giving a mortality of 35.7 per cent. In 4 cases convulsions began after labour, with 3 deaths. Three were admitted with convulsions without signs of labour, and in 7 convulsions began during labour. In all the 5 fatal cases there was a high temperature, and in 4 there was only little albumen, and it is noted that "convulsions commencing after labour, a small amount of albumen, and a high temperature are all bad signs." In 1 case, however, recovery took place, though the convulsions began after labour and the temperature was 103.8°. The treatment was generally rest in bed in a warm room with milk diet, infusion of normal saline under the breasts or per rectum, opening the bowels with calomel or croton oil and a saline mixture. In 2 successful and 1 fatal cases thyroid extract was given as well as a diaphoretic mixture, while venesection with transfusion was sometimes used. In only one case is morphine mentioned as being given for restlessness. No rule was observed as to bringing on labour, several cases being dismissed still pregnant after the fits had ceased. In some labour came on naturally, while in others instrumental or manual dilatation was used, with forceps or version. Five cases of hyperemesis were admitted, of which one aborted, one had hydatid mole removed, one was curetted, and two recovered after being kept in bed on milk diet, with small doses of calomel and high rectal lavage. Six cases of chorea gravidarum occurred, all recovering and being dismissed still pregnant. The treatment adopted is to keep them in bed on milk diet, and to aid elimination by the bowels, skin, and urine, on the supposition that the condition is caused by a toxin, as in eclampsia and hyperemesis. The total infant mortality was 105, that is about 30 per cent., but this high rate is accounted for by the fact that almost all the mothers were admitted for some special reason, the child often being already dead. The small number of beds available makes it necessary to confine them to serious cases, and shows how fallacious must be any comparisons between the infant mortality at different maternity hospitals.

South Australia.

THE ADELAIDE HOSPITAL.

MANY changes have taken place lately in the staff of the Adelaide Hospital. After nearly thirty years' service Dr. J. C. Verco has resigned his appointment, and become consulting physician. He had so well dovetailed his clinical instruction with the systematic lectures at the university that, although he will continue to deliver the latter, the medical school will feel itself the poorer for his resignation. The vacancy has been filled by the promotion of Dr. H. Swift, a graduate of Cambridge, who has served an unusually long apprenticeship in the out-patient department. Dr. E. A. Johnson has been appointed full physician, vice Dr. Niesche, who has accepted the dignified ease of the consulting ranks. The out-patient posts thus rendered vacant have been filled by the election of A. H. Gault and J. B. Gunson, graduates of London and Adelaide respectively. The memorial stone of the new nurses' quarters was recently laid by the widow of the late Premier, the Hon. T. Price.

THE ANNUAL MEETING OF THE SOUTH AUSTRALIAN BRANCH.

The usual business meeting and dinner took place on June 24th, and both functions were well attended. The incoming President (Dr. W. A. Verco) is, like his immediate predecessor, an Adelaide native and graduate. Dr. Morgan's retiring address was a comparison of things medical twenty years ago with now, a very fertile source of inspiration for such addresses. He acquitted himself in an interesting manner. A graceful compliment was paid the Treasurer (Dr. W. T. Hayward) by electing him Vice-President, so that he may succeed to the Chair which he occupied just a quarter of a century ago. Dr. Gunson, for many years the valued Secretary, takes the treasurership, and Dr. H. S. Newland succeeds him as Honorary Secretary.

DIPHTHERIA.

A couple of years ago or so, it was no uncommon event for the diphtheria wards of the Children's Hospital to be unoccupied for some weeks at a stretch, so much so, indeed, that the management wondered whether it was necessary to reserve so much accommodation entirely for this disease. The opinion of the medical staff was sought and they pronounced in favour of being prepared for any possible emergency. This opinion has unhappily been fully justified, for during the past twelve months there have been several rather serious epidemics, which, if they did not originate at, were disseminated in, the State schools of Adelaide and suburbs. The Chairman of the Central Board of Health, Dr. Ramsay Smith, held a sort of court-

martial on the Walkerville Local Board of Health. To the impartial mind the failure seems rather to be in the mode of administration of the Health Act by the Central Board than by the local boards or their officers of health.

New South Wales.

Lunacy.

The annual report of Dr. Eric Sinclair, Inspector-General of the Insane for New South Wales, for the year 1907 shows that the total certified insane of the colony on January 1st, 1907, numbered 5,525, and on the last day of the year 5,607, giving an increase for the year of 82, as compared with the increase of 248 for 1906, or of 140 for the vicennium. The proportion to general population was 1 in every 280, which closely approximates to the ratio in England and Wales for that year. A table giving the proportion of the insane to population in the Australian States and New Zealand since 1882 shows that the ratio has progressively increased in New South Wales as at home, but with wider fluctuations and somewhat more rapidly. Like statisticians in England, Dr. Sinclair considers that this increase is due mainly to accumulation and not to an increasing rate of occurrence. The considerable numerical increase, however, has resulted in a great excess of patients over provided accommodation in the State hospitals, amounting at the end of 1907 to as much as 508. Of the total number remaining at the end of the year, 5,320 were in the six State hospitals, 57 in the three licensed houses, 199 were absent on leave, and 31 were in South Australian hospitals. The total cases under care during the year numbered 6,657, and the average number daily resident 6,355.

Admissions.

During the year 977 were admitted, as compared with 1,123 for the preceding year, or the average for the preceding five years of 1,032. Of the admissions 824 were first and 153 not-first admissions. As regards nationality, 519 were natives of New South Wales and 89 of other Australian colonies. England contributed 169, Ireland 91, whilst, as usual, the number of Scotsmen (41) was low. The small remainder were from France, Germany, China, and other countries. The admissions were classified according to the forms of mental disorder into: Mania of all kinds (including delusional, alcoholic, and puerperal mania), 457; melancholia of all kinds, 220; primary, secondary, senile, and organic dementia, 109; general paralysis, 49; epileptic insanity, 28; congenital and infantile defect, 113; and not insane, 1. As regards causation, alcohol was assigned in 171, or 17.5 per cent. This is possibly an under estimate, however, for considerable numbers of patients pass through the reception houses at Darlinghurst and Newcastle, and, being discharged as recovered therefrom, do not appear in the returns of the State hospitals and licensed houses. Venereal disease was assigned in 23, critical periods in 142, previous attacks in 146, bodily trauma in 41, sunstroke in 8, pregnancy, parturition, and the puerperal state in 32, epilepsy in 31, various bodily diseases and disorders in 115, and moral causes in 179.

Discharges, etc.

During the year 413 were discharged as relieved, giving the satisfactory recovery-rate on the admissions of 42.27 per cent.; 86 as relieved and 183 were transferred. Also 3 escaped and were not recaptured, and 396 died. The deaths, giving a death-rate on the average numbers resident of 7.39 per cent., were due in 161 to cerebro-spinal diseases, including 70 deaths from general paralysis; in 112 to chest diseases, including 48 deaths, or 12 per cent. of the total deaths, from pulmonary consumption; in 52 to abdominal diseases; in 29 to senile decay and debility; in 5 to accident or suicide, and in the remainder to general diseases.

Cost.

The average weekly cost of maintenance per head in the State hospitals was 8s. 9d.

Reception Houses, Darlinghurst and Newcastle.

On December 31st, 1906, there remained 8 patients in the above reception houses. During the year 1,005 were admitted, 844 of these being admitted on remand from the courts, and 161 under lunacy certificates. During the year 5 were discharged recovered under certificates, 1 on remand, and no less than 454 as recovered to the police court, that is, without being sent to a hospital for the insane. Presumably many of these cases were suffering from temporary mental disorder, the result of alcoholism, but no table is furnished as to the clinical forms of the admissions to the reception houses. During the year 339 were sent to the police court and returned to the reception houses, 32 were transferred to hospitals or licensed houses on remand, and 156 under lunacy certificates. In all, 987 were discharged and 8 died, leaving 18 in the reception houses at the end of the year. The fact that 454 were discharged recovered without passing through asylums testifies to the value of these institutions.

Arrangements have been made to erect in the grounds of the reception house at Darlinghurst a small building with twenty beds for the early treatment of insanity, apart from the regular hospitals for the insane, without certification. Also, within a short period of the publication of Dr. Sinclair's report, each of the larger hospitals for acute cases of insanity, was to have an admission ward so arranged as to form a special mental hospital in itself, and Dr. Sinclair hopes that at an early date the general hospitals will provide special wards for mental cases.

Cape Colony.

Lunacy in 1908.

The reports on the Government-aided hospitals and invalid homes, on asylums for lepers and lunatics, and on chronic sick hospitals, including the report of the Inspector of Lunatic Asylums of the Cape of Good Hope for the year 1908, have recently been issued. The report of Dr. W. J. Dodds, Inspector of Asylums, shows that on December 31st, 1907, excluding the children in the Institute for Imbecile Children, there were 1,924 certified insane in asylums, gaols, licensed houses, and in single care, and that on December 31st, 1908, there were 2,005—an increase of 81 for the year. The increase, however, appears to be governed by the accommodation available, and does not represent the actual growth of insanity in the Colony. According to the census returns of April 17th, 1904, there were then 3,019 insane persons in the Colony, whereas the number registered was only 1,773.

The ratio of the total registered insane to population now is 1 in 1,359, distributed according to race as follows: White insane to white population, 1 in 678; white insane born in Africa to white population born in Africa, 1 in 944; white insane born elsewhere to white population born elsewhere, 1 in 366; and other than white insane to other than white population, 1 in 1,994. It is thus evident that the immigrant whites give far the largest ratio of insanity and the native population the lowest, so far as registered insanity is concerned. These insane were detained in the seven asylums and mental hospitals of the Colony and in the insane leper wards of Robben Island. The average number daily resident in 1908 was 1,934, and the total numbers under treatment, 2,259. Of the total patients at the beginning of the year 917 were white and 1,067 coloured. Of the white patients 521 were born in the Colony, 1 in another part of South Africa, 168 in England and Wales, 36 in Scotland, 50 in Ireland, 10 in other British settlements, 5 in Holland, 38 in Germany, 81 in other countries, and in 7 the birthplace was unknown. Of the coloured patients 894 were born in the Colony, 143 in other parts of South Africa, and the rest in other countries.

During the year 539 were admitted (white 236, coloured 303), or, excluding readmissions after lapsed or quashed reception orders and transfers, 361. The admissions were classified according to the forms of mental disorder into: Mania of all kinds, 202 (white 41, coloured 161); melancholia of all kinds, 64 (white 49, coloured 15); senile and secondary dementia, 96 (white 47, coloured 49); general paralysis, 24 (white 16, coloured 8); insanity with epilepsy, 22 (white 10, coloured 12); delusional insanity, 39 (white 30, coloured 9); confusional insanity, 8; stupor, 8; moral insanity, 3; insanity with gross brain lesions, primary dementia, and volitional insanity, 1 each; unclassified, 4; and congenital or infantile defect, 56 (white 17, coloured 39). The preponderance among the coloured admissions of mania and imbecility and the comparatively small proportions of melancholia, delusional insanity, and general paralysis are here well marked. As regards probable causation, the returns from Valkenberg, Robben Island, Fort Beaufort, Grahamstown, and Port Alfred, to which asylums there were 417 admissions, show that in 267 no cause could be assigned; alcohol in only 11 of the white and 2 of the coloured admissions; venereal disease in 2 (24 general paralytics admitted); critical periods in 28; previous attacks in 60; and mental and moral stress in 20 of the white and 8 of the coloured admissions. Hereditary influences were ascertained in 21 of the white and 18 of the coloured

admissions, and congenital defect in 18. During the year 109 were discharged as recovered, giving a recovery-rate calculated on the direct admissions of 30.2 per cent., as compared with the average since 1892 of 37.0 per cent. The recovery-rate for Europeans was 35.71 per cent., and for the coloured 25.39 per cent. The average recovery-rate for Europeans is 40.9 per cent., and for coloured 28.8 per cent. Also 20 were discharged as relieved and 23 as not improved. During the year there were 127 deaths, giving a death-rate on the average numbers resident of 6.6 per cent. The European death-rate was 7.2 per cent., and the coloured 5.9 per cent., as compared with the averages of European (7.6 per cent.), and coloured (9.9 per cent.). The deaths were due in 59 cases to cerebro-spinal diseases, including 20 deaths from general paralysis (European 17, coloured 3); in 22 to chest diseases, including 9 deaths from pulmonary consumption (European 1, coloured 8); in 19 to abdominal diseases; in 32 to general diseases, including 16 from tuberculosis (European 2, coloured 14) and 9 from senile decay; and in 3 to accident or violence. Tuberculous disease caused thus 4.6 per cent. of the European deaths, and 35.5 per cent. of the deaths in the coloured.

India.

THE BOMBAY BACTERIOLOGICAL LABORATORY.

THE report for the year 1908 has been submitted by the Director, Captain W. Glen Liston, M.D., D.P.H., I.M.S. The institution continues to carry on the plague work for which it was originally organized, and fulfils the purpose of a general bacteriological laboratory for the province in addition. The report gives details of work done in both aspects. Notwithstanding that plague was milder than in 1907, the issue of antiplague vaccine was little short of that of the preceding year, when the disease was severely and widely prevalent, the number of doses dispatched being 533,315 against 620,923. This fact is held to indicate that the practice of inoculation is becoming more popular. Evidence is recorded in support of the protective power, and no accident has been brought to notice from the use of over one million doses in both years. Experiments were carried out regarding the efficiency of rat and rat-flea destroyers, but they were not satisfactory or conclusive. The general bacteriological work was of a varied description, and must have been very helpful to medical officers. Special inquiry was made regarding an outbreak of malaria in the fort and dock area of Bombay; the investigation is still in progress. An outbreak of relapsing fever in the Kolaka district was also made the subject of special study. The laboratory rendered assistance and advice regarding questions relating to plague and other infective diseases, and courses of instruction were arranged for hospital assistants and others with reference to plague inoculation and bacteriological work.

THE HEALTH OF BOMBAY.

The report of the health officer of the city of Bombay, Dr. J. Turner, D.P.H., for the year 1908, gives evidence of improved sanitary conditions. The birth-rate—20.62—was higher than usual. The health officer gives reasons for concluding that the rate is too low, and calculates that 32.4 is near the actual rate. Estimating the infantile death-rate on the adjusted birth-rate, the result is an infantile mortality of 286 per 1,000, still a very high figure, demanding for its reduction strenuous efforts the nature of which the health officer suggests in detail. The death-rate of the year was 39.13, the lowest recorded since 1896, the year of introduction of plague. There was a great reduction in the prevalence of this disease, which commenced later and lasted longer than usual. The deaths, 5,361 (5.48 per 1,000), the smallest aggregate since 1896, the highest (20,788) being in 1903. Efforts were made to commend inoculation and rat destruction; 374,386 rats were destroyed, of which about a third were examined, and 12.3 found to be infected. Outbreaks of small-pox and measles in the early part of the year enhanced the mortality. Vaccination and revaccination were pushed. In December 66 cases of cholera, of which 58 proved fatal, occurred in consequence of importation from the "Linhasta" fair at Nasik. Active measures were taken to stamp out the disease, with success. An unusually severe outbreak of malaria occurred in the third quarter of the year, against which an active antimosquito campaign was undertaken. There was a reduction in the mortality caused by enteric and relapsing fever and phthisis. The report contains ample details regarding sanitary administration and work which betoken intelligence and action, and give evidence of substantial progress. The municipal laboratory, under Mr. B. T. Ghadially, rendered excellent service, and gave a large outturn of analytical and bacteriological work.

Correspondence.

CLINICAL TEACHING.

SIR,—I venture to say it is too apt to be forgotten in the education of the medical student that medicine and surgery, while scientific, are yet technical subjects.

To become a properly accomplished physician, or, still more, an expert surgeon, requires, not only knowledge of, but practice in, the art of treating disease.

Ars longa, vita brevis. Surely no opportunity from the first should be lost for acquiring that intimate relationship with his life's work which is to become the very foundation of the future medical man's success in his calling.

To understand any subject in the proper sense of the term is to come to close quarters with it.

Without the actual living reality before him, the tiro can only at the best have a "second-hand" knowledge of his business.

To take an extreme example. I yield to no one in the necessity for a thorough knowledge of human anatomy. Without such scientific equipment, a medical practitioner is not worthy of the name of "doctor." He can only be a quack in disguise.

And yet I am fairly convinced that by the present methods of study a great deal of time is wasted in the teaching of anatomy. No doubt an industrious student acquires a fair stock of anatomical facts, mainly because he knows he has to. But, even when he does his dissection work faithfully, the knowledge he gets is more for the object of passing examinations than for any really recognized after-purpose. He entirely fails to see clearly what relation such a study holds to his future vocation.

All this vagueness results in mere cram, with the inevitable effect that, sooner or later, the knowledge so painfully garnered, falls away from his mind and is forgotten.

On the contrary, by the well-established law of association of ideas, starting from the actual patient, the anatomy, learnt bit by bit, is connected with something tangible, and is retained for life.

I hold that the young student of medicine should straightway be introduced into the out-patient room of his hospital and, *under the guidance of a suitable instructor*, be set to take the temperature, count the pulse, examine the tongue, inquire as to the more outstanding symptoms, make a rough record of the particular case, with name, age, occupation, residence, and other plain facts, all to be entered on a card for future reference.

This process should be gone on with day by day, while all the time he was attending anatomical and physiological lectures and working in the dissecting rooms, and continued to the end of the curriculum.

In this way his interest in these scientific subjects would be stimulated. Without such stimulus his efforts to learn are more than likely, as we have said, to be barren of any permanent good effect.

Apprenticeship bred many good and some distinguished doctors, of whom I may be allowed to mention the late Sir James Paget and the still-living and honoured Sir William Turner.

The system had its drawbacks, which it is unnecessary here to specify. On the other hand, it had the undoubted advantage of *atmosphere*. Why not retain the good and avoid the bad side of the old plan?

Of all the faults of modern advanced education the greatest, as has been lately so well pointed out by Sir J. J. Thomson, himself a noted specialist, in his presidential

address in Canada, is over-specializing. Nowhere is specialism more rampant than in the medical schools, where, as the rule, every teacher plays off his own bat, and no captain regulates the innings. When in general practice I had many years' experience of newly qualified assistants. I can call to mind two examples of the kind of man fresh to his duties. One, in the course of a fairly busy fortnight, was so taken up with studying German irregular verbs, that he never got beyond prescribing mustard poultices for all and sundry, and another, a first university prizeman in medicine, whose brains were so addled by overstudy that after some time I had to send him away as useless for any good purpose.

With clinical education on its present footing I quite grant the changes I am advocating are open to grave objections. Fooling about the out-patient room or the wards is sheer waste of time. The loafer is only in the way of the worker. Students would require to be put under the strict surveillance of a proper tutor. And this leads me to affirm that the present system of clinical teaching is altogether on wrong lines in so far as the physician and surgeon have to do a kind of work which they should not be called upon to do, and the opportunity of employing younger and less busy men is not taken advantage of as much as it should be. Hospitals should be looked upon as technical workshops or training schools.

I am well aware that this aspect of their functions meets with much opposition from the nursing sisterhood, and in some cases also from the managers of these institutions. So much is this so, that on the part of the surgeons and physicians there is a disposition to keep this department of their work in the background so as to escape opposition. Surely cowardly behaviour on their part. How else is the budding doctor to be trained? If the master is willing to devote his time and give the result of his experience, with small fee or reward, for the public advantage, he has a clear right to demand that he should have all freedom and every opportunity to help his younger brother and pupil.

If this be true, then it follows that the clinical teacher is entitled to such an amount of *paid* assistance as will enable him to properly perform the particular duty which his position as the holder of a hospital appointment and his relations to his fellow-practitioners make it incumbent upon him not only not to neglect but cheerfully to discharge.

What help, then, does he require, and how is it to be arranged for? For every twenty beds a capable junior physician or surgeon should be appointed to take charge of the corresponding patients, under the supervision of the full surgeon or physician, in the interests of the sick as well as those of the students. He would arrange matters so that nothing would be done to injure those allotted to his care. The number of his pupils should not exceed, say, twenty, so that he might have ample time to teach the significance of normal as well as of abnormal signs and symptoms, and be able to thoroughly drill and train his class.

It may be objected that in the larger hospitals, with the number of pupils limited as has been suggested, too many tutors would be required. The answer is that a good half of all the patients in hospital would most probably be unsuitable for demonstration purposes, and further, within certain limits, there would always be a certain number of older pupils, such as clerks and dressers, able to take charge of a moiety of available beds and to make use of them for the purpose mentioned. On the other hand, the out-patient department, as the most valuable field for instruction, would remain in the hands of the regular staff of assistant surgeons and physicians attached to the hospital.

Given such a system as sketched, two fruitful by-results would follow. The *Privat-docent* would himself continue to learn and there would be an ample field for research work—the best of all means for the sound training of the medical mind.

In what I have attempted to show in the way of reform of clinical teaching I have assumed, first, that in due course there will be established a preliminary examination in science for the aspiring student so that the medical curriculum may be wholly devoted to its special purpose, and, secondly, that the nefarious system of frequent examinations will be abolished in favour of the seminar method of ensuring attention on the part of the pupil by careful records of work done under his teacher with one final testing of the complete results before granting him his degree or diploma.—I am, etc,

WM. BRUCE, Hon. LL.D.Univ.Aber.

Dingwall, N.B., Sept. 20th.

DEATH DUTIES AND LIFE ASSURANCE.

SIR,—There is no class of the community to which life assurance is more necessary than to medical men, for, owing to the additional risks they run from overwork, exposure, and infection, their life is more uncertain than that of most others. Unfortunately, also, the life of most medical men is a very hard one. Not only do they give gratuitously much of their time, skill, and labour to the poor, but often their just dues are unrighteously withheld from them by those who could well afford to pay. The smallness of the margin between their necessary expenses and their yearly income prevents most medical men from rapidly accumulating money, and the only way of providing for their families is that of life assurance by the annual payment of small sums. The value of foresight and thrift, not only to individuals but to the community, has been recognized by former Governments, who have encouraged the growth of these virtues by exempting from income tax the premiums for life assurance. But how does the present Budget propose to treat thrift and forethought? If you will allow me, I will give my own case as an example, because a concrete instance will serve as an illustration better than general statements. When I married, more than a quarter of a century ago, the income I derived from my consulting practice was very small indeed, and although I supplemented it by examinerships and by literary work, my wife and I were obliged to live in a small house, in a small street, and with great economy. Yet out of our scanty income we paid every year for life assurance a sum which would have made all the difference between straitened means and easy circumstances. We were willing to do this for the sake of each other and of the children, and were encouraged to do it by the action of the Government in remitting income tax on the money we were laying by. But this policy of fostering thrift, which previous Governments have followed, has now been thrown aside, and the present Government now proposes to penalize it. Because my wife and I denied ourselves luxuries and enjoyment in order to lay aside a provision for our children, instead of spending the money every year on our own pleasures, the Government proposes to confiscate a large proportion of our savings as death duties. It may be said that in doing this the Government is only collecting taxes which had been remitted on the premiums for life assurance in previous years. But is the Government justified in doing this? Let us see what would be said about such conduct in the case of an individual. Let us suppose that an employer gives to one of his men 2d. a week extra wages on condition that he shall lay by 5s. a week in order to prevent him or his family ever becoming a charge on his employer. Stimulated by his employer's action, the man denies himself, let us say, beer and tobacco, for the rest of his life, his wife economizes in every possible way, and thus he accumulates enough to secure his wife and family from want; but on the man's death the employer steps in and extorts from the poor widow a large proportion of their hardly-won savings, on the plea that the 2d. a week had once been his money and he had a right to have it back with interest and compound interest. Would this act be just and right, or would it be robbery of the basest kind? I should like to ask this further question, Is the morality of the action different if it be done by Government officials instead of by a private individual? I leave these questions for the readers of the BRITISH MEDICAL JOURNAL to answer and to decide what action, if any, they will take in relation to them —I am, etc.,

September 20th. A HARD-WORKING PHYSICIAN.

THE POSTMASTER-GENERAL AND POST OFFICE APPOINTMENTS.

SIR,—I would like to add my testimony as to these appointments being non-political.

Some years ago I heard incidentally from one of the postmen that there was no medical officer within the

district. I promptly sent in my application for the post to head quarters. It was duly acknowledged. Some time after an official called and informed me that there were other applications, but that I was "first in the field," and was very near the sorting office, and that, should I still be desirous of doing the work, I might consider myself duly appointed.

My natural modesty forbids my giving what I personally consider better reasons, but of this I am sure, politics had nothing to do with the matter.

I would like to add that in the Postal Medical Service one meets with the utmost courtesy, both from head quarters and from those entrusted to one's care.—I am, etc,

J. P. O'HEA, F.R.C.S.,
Medical Officer, Post Office, Catford.

September 20th.

COLOUR BLIND ENGINE-DRIVERS IN FRANCE.

SIR,—With reference to your article on colour-blind engine-drivers in France, may I state that in 1905 I pointed out in the *Indian Medical Gazette* that there was a distinct variety of colour-blindness under the title of "Defective Distant Colour Vision." While examining the eyesight of men for the East Indian Railway I came across cases which could pass the wool tests with ease, and lamps for night vision when near, but completely failed to distinguish colours at a distance when quite easily seen by normal eyes.

This article seems to have quoted from M. Clerc exactly the same thing, and perhaps after some others have noticed and reported cases of "defective distant colour vision," the necessity for all railwaymen, seamen, and others employed in duties necessitating good distant colour vision, being tested for this type of defect will be recognized.—I am, etc.,

H. G. WATERS,
Medical Officer, East Indian Railway, India.

Buxted, Sept. 18th.

RADIOGRAPHERS AND TREATMENT.

SIR,—The remarks of "Vacuum" on the subject of the safety now attending the use of *x* rays should be more widely known. The President of the Roentgen Society summed up the present situation by saying: "He is a fool who burns himself, and a knave who burns his patient." *X* rays can now be so safely measured that there is no longer any danger from them in experienced hands.

By the use of Sabouraud's pastilles it is possible to measure the dose of *x* rays sufficiently accurately for practical purposes. By their use it is also possible to show that so little *x* rays escapes from the back of the tube, that if the operator keeps behind the tube he gets rays of so little power that they can do him no harm. *X* ray tubes are nowadays covered in so that only a cone of rays is allowed to escape, and the operator can easily avoid this cone. The *x* rays which penetrate through the protecting devices are not of any power and can do no harm. But of more value than protecting devices is the fact that the power ot *x* rays diminishes inversely as the square of the distance.

While giving a therapeutic dose in half an hour to a patient placed at 17 cm. (6¾ in.) from the source of the rays, suppose the operator sits in the path of the rays at a reasonable distance, say three yards, from the tube. One can calculate from the square of the distance the dose which the operator will receive. He would have to sit for 6 days and 22½ hours at a distance of three yards before he got a dose equal to that received by the patient in half an hour at 6¾ in. (17 cm.).

To put it another way, under the same conditions, while the patient received his therapeutic dose in half an hour, the operator would receive $\frac{1}{333}$ part of the dose the patient received.

It is thus evident how safely one can expose oneself to the rays, provided one keeps at a reasonable distance. There should be no risk to any *x*-ray operator who understands these principles.—I am, etc.,

A. HOWARD PIRIE.

London, W., Sept. 19th.

THE POOR LAW REPORT AND THE SANITARY SERVICE.

SIR,—Every member of the Public Health Service must have experienced a considerable amount of relief when they read your assurance, given in the issue of August 28th, in reply to the letter of Dr. H. Beckett-Overy on the above subject, to the effect that you trusted that you may number yourself among those wise men who have not yet made up their minds as to the effect of either the Majority or the Minority Report. Otherwise there would have been an obvious danger of your leading article in the issue of August 21st being regarded as a most determined attack on the Minority Report. All public health officials must have felt great regret to think that a paper of the importance of the BRITISH MEDICAL JOURNAL should have thought fit to use the word "calamitous" in describing the results of a scheme that must commend itself to all medical officers of health of experience. It is true that in the article referred to you also mention the dangers of unlimited contract practice and provident dispensaries as inevitable parts of Dr. Downes's scheme, but the remainder of the article is apparently devoted to presenting as favourable as possible a view of the Majority Report, and an unfavourable one of the Minority Report.

The first statement made is, that the sanitary service will become far less attractive if the Minority suggestions are carried out, and it is inferred that it would continue to remain as attractive as it is at present under the Majority scheme. The facts are that Dr. Downes's scheme, if carried out, would take from the medical officer of health all his isolation hospital work, his sanatorium work, his rapidly developing work in connexion with the crusade against tubercle, his school medical work, and his work in connexion with the problems of infantile mortality. It would, as you say, leave him "strictly sanitary duties." One has only to read the reports of the medical officers of health of the present day to realize how much would be left when all the above spheres of activity had been removed. In such a scheme the medical officer of health would be degraded to the level of a kind of superior sanitary inspector.

The next point that is dealt with is a comparison between the machinery for working the two schemes. A little experience in public affairs, and in official work, would convince any one that the Minority scheme is workable with very few modifications, while that of the Majority would lead to endless confusion, and would, as I have shown above, most injuriously affect the position of the medical officer of health. The medical officer of health in all important counties and boroughs is at present accustomed to deal with several separate committees, so that the prospect of dealing with four committees under the Minority scheme is not at all terrifying. Experience in public work convinces most people of the advantage of having separate committees dealing with separate matters, and it is certainly no argument to say that because there would be four committees there would be overlapping. Carefully studied, the Minority scheme appeals to one very forcibly, on account of the fact that it would tend to *remove* the enormous amount of overlapping and omissions that exists under the present system.

Next comes the bogey of the "registrar." Although you say that "this is no fanciful picture," I should imagine that most people who read the report in question will find it difficult to stretch their imaginations so far as to follow you.

The registrar would be an ordinary official serving the General Purposes Committee of the council; he would have no autocratic powers at all, and he would in every case have to obey the orders of his committee and council. He would have no veto on medical treatment, and no power whatever to criticize it.

It would be interesting to know on what grounds you base your statement that the registrar is to be invested with power absolutely to veto the decisions of the medical officer of health when he decides that home treatment and home aliment are necessary. Moreover, there would certainly be no question of health committees having their "carefully considered resolutions overridden by a single paid official." Even if this were possible, it is not the position of the medical officer of health that would be unenviable, but the position of the registrar, because the General Purposes Committee would undoubtedly contain

some members of the Health Committee. The registrar would *not* decide disputes between committees. His duty would be merely to see that the medical officer's certifications are complied with.

Reference is also made to the difficulty of dealing with different members of a single family by separate committees, and of the difficulty of deciding whether a person is able-bodied or not. It appears to me obvious that the county medical officer himself would decide under which committee any particular case came, because, apart from fixed limit of age, every person who is not medically certified to be (*a*) sick, or (*b*) mentally defective, or (*c*) so infirm as to need nursing, etc., is assumed to be able-bodied. The certificate of the county medical officer would decide every case, and the registrar would not have anything to do with his classification.

The registrar's temporary receiving house would be used only for cases that have failed to be found, or to be dealt with, by the committee concerned. Its main usefulness would probably be during the earlier working of the scheme. When the scheme was once established, and in smooth working order, the receiving house ought always to be empty.

To those who have had active association with the medical officers of health of small urban and of rural districts, your allusion to these gentlemen as "each one the head of his department" is distinctly amusing. Such medical officers of health in existing conditions are paid a miserably inadequate salary, are heads of no departments at all, are subject to impertinent interference from clerks to the petty local council, have practically no control over the so-called sanitary inspector, who is usually local surveyor as well, and who does little or no public health work—and, in addition to all this, the medical officers of health have no security of tenure and may be suddenly deprived of office without a moment's notice. I should imagine, therefore, that you will find it difficult to arouse antagonism against the Minority Report among the rural medical officers of health. They fully realize that if they do their work as it should be done they would lose their appointments, and a large number of such medical officers have personally expressed to me their hope that the public health work of their districts would shortly be taken over by the county authorities. The conditions under which they are doing their work at present are disheartening and degrading. Under the Minority scheme all offices abolished would, of course, receive full compensation. It is extremely likely, however, that these medical officers of health would be retained as the local assistants to the county medical officer, and would thereby obtain not only security of tenure, but also adequate remuneration for their work as well as the assistance of properly qualified whole-time sanitary inspectors.

Existing assistant medical officers of health instead of being "swamped," as you suggest, would, if they have proved their suitability for the work, have first claim for the great number of new posts to be filled by medical men that would undoubtedly be created under the Minority scheme.

Every one must admit that there is an enormous amount of unrecognized and untreated disease among the poorer classes. If the treatment of these cases is to be undertaken, and if all treatment is to take place under more favourable conditions and to be more thorough, it is obvious that there must be an enormous demand for medical services, and it simply rests with the medical profession to so organize itself as to take proper advantage of this demand. A very large number of new posts will have to be created to deal with the work connected with the poor and public health. These posts will attract applicants from among those members of the profession who are at present engaged in unremunerative practice, and, in its turn, the depletion of the ranks of the general practitioners will necessarily tend to the increased prosperity of those who are left. In most practices there is a varying proportion of unremunerative work which is being done at present by the general practitioner either without pay or without proper pay. These cases would be taken over by medical officials whose work would be properly paid for. It is obvious, therefore, that the total remuneration from the public to the medical profession would be enormously increased under the Minority scheme, and at the same time the work would be made more thorough, and would be done under much more satisfactory conditions.

All members of the medical profession who have not already done so should make a careful study of the Minority Report. They would see that the existing conditions of medical work in hospitals, in dispensaries, and by Poor Law medical officers have been properly appreciated by the authors, and that the scheme aims at putting an end to those disgusting conditions of work, as well as the overlapping and abuse that are so common.

A great deal more might be said on this subject, but I think that most medical officers of health will agree that your statement that "the interests of the medical officers of health are threatened" is as yet unproved, and is not justified by a careful perusal of the Minority Report. In fact, there is no doubt that a large number of medical men claim that the reform of the Poor Law upon lines of the Minority Report would be a distinct gain to every branch of the profession, and would introduce reforms that have long been demanded by medical officers of health and district medical officers.—I am, etc.,

Winchester, Sept. 9th. ROBERT A. LYSTER.

"PROFESSIONAL ADVERTISING."

SIR,—I happen to be one of those obscure individuals alluded to in your article, entitled, "Professional Advertising," which appeared in the last issue of the BRITISH MEDICAL JOURNAL. My name was included in a list of surgeons mentioned in a publication styled *To and Fro*, a distinction equally undesired and undesirable.

I, for one, did not deem it worth while to indicate in the medical press that I was not responsible for the appearance of my name in that list. Since, however, there seem to exist persons, such as the writer of the article in question, so charitably disposed as to imagine that any surgeon would willingly have his name included in this list, and would even pay for that privilege, I beg to assure both your readers and him that I am not to be included in that category.—I am, etc.,

London, W., Sept. 18th. J. ERNEST LANE.

⁂ There was no suggestion in the annotation in question that any of the medical men whose names have so far appeared in this book have paid for their insertion. Indeed, we thought we had made it clear that we did not believe this to be the case. On the other hand, it would appear from the correspondence mentioned that the publishers intend in future lists to limit the insertion of names usually to those of persons from whom they have received a definite *quid pro quo*. Hence the inference from the habitual appearance of any name will be obvious. Fresh and revised editions of the guide are supposed to appear monthly, so there should be no difficulty in the way of any medical man who desires to have his name omitted.

CONTRACT PRACTICE.

SIR,—I quite agree with your correspondent "F, W. S." when he says the General Medical Council should prohibit contract work or state a minimum fee below which no self-respecting practitioner should accept the work. I, like thousands of others, have had the misfortune to get into club work, and know something of the mean servility in such practices. Club patients as a rule get more attention, even when they are malingering, than private patients, the medical officer wishing to stand well with the members in case his brother practitioner across the street steps in and takes the club from him. All this work and anxiety brings him is £20 or £30—that is the average amount from most clubs. If we club doctors would consider that contract work does not keep us, and by our rivalry and competition in such work we really induce people to join friendly societies, for the principal "draw" is often a good doctor for 2s. 6d. or 3s. per annum, we would be taking the first step to free ourselves and descendants from a degrading bondage. I enclose my card, but do not sign my name, as two of my club patients take the JOURNAL weekly.—I am, etc.,

August 18th. C. B.

THE DOCTOR AS A PHILANTHROPIST.

SIR,—I think the letter of "Anglo-Colonial" calls for remark. With his views on the subject of charging good fees we must all agree. A man who is worth anything in

his profession can always obtain these fees; the only people who go to a medical man simply because he is "cheap" are not worth having as patients; they naturally have a poor opinion of the doctor, and they treat his advice at the value he does, and unless it is quite convenient they don't follow it.

I have been in a surgery in South London where the medical man's advice and *three* bottles of medicine could be obtained for one shilling. I cannot help thinking that probably even then the people were paying that particular member of our profession too much.

But when "Anglo-Colonial" goes so far as to refuse attendance unless he is sure of his fee I cannot agree with him. We must expect to do a certain amount of work for nothing. The butcher, the baker, the fishmonger, give away much food for nothing; the members of the St. John Ambulance Association give up time and money to render assistance in cases of accident, and yet "Anglo-Colonial" refuses to go to a street accident. A busy city man coming upon an accident would stop to render help; the shopman will lend shutters, the publican will come out with brandy and what not, and yet a medical man will refuse his help. One would have thought that "Anglo-Colonial's" commercial instincts would have shown him it was better to attend to an accident and not get paid than to be abused (and I contend rightly) round the district.

The medical profession has always had the credit with the public of being a noble profession, and it is the duty and privilege of each member of it to uphold its dignity, and, if possible, to make it really a noble profession, neither degrading it by taking ridiculous fees, or refusing help to suffering humanity. Many of us have to depend entirely on our professional income for a living, but if any man enters our ranks purely as a commeraial occupation he had better have chosen some labour where humanity is not required as a stock-in-trade; we are here to alleviate suffering and we must do our utmost, "to the last gasp," to do so whether we are paid for it in coin of the realm or not.

A third point raised by your correspondent is the inadequate payments to medical men by public bodies: this is a different matter altogether, the poor salaries paid to the medical officers of health is a disgrace. The care and watchfulness of these men not only is the means of saving lives and making them healthier and happier, but it actually saves the community a considerable sum of money in medical fees, probably some thousands of pounds for every hundred spent on the medical officer of health, and when we see the salaries paid to other employees of the public we notice how inadequate, in comparison, these payments to our profession are; this is a matter on which I think, as a whole, the profession can take action without detracting in the slightest from its dignity or nobility.—I am, etc.,

Leytonstone, August 23rd. ARTHUR TODD-WHITE.

PLACENTA PRAEVIA IN PRIVATE PRACTICE.

SIR,—Whatever method of treatment of this complication of parturition is adopted in towns, the country practitioner who has to deal with placenta praevia "on his own" should stick fast to the old way by turning and bringing down a foot.

I have so treated (in cottages without help) four cases—two marginal, one each lateral and central. In every case I had to dilate the cervix somewhat with the fingers to permit of the foot being grasped and brought down. It may be taken for granted that the child will die under this method, but, if properly carried out, I believe there should be practically no risk to the mother. In my "central" case the child was delivered through the tear in placenta, as on expressing the after-birth the membranes were found untorn, but the haemorrhage during the process of manipulation and delivery was trifling; there was no *post-partum* haemorrhage, and I left the cottage eighty minutes after going in. This treatment, too, avoids a risk attendant on the use of dilator and forceps—tearing of the cervix.

It is a serious call upon the self-possession of a young practitioner to find himself suddenly confronted with a case of placenta praevia miles from assistance, but I am confident that if he will carry out this method as admirably directed in Herman's *Difficult Labour*, he will be so satisfied with results as never to desire change.

While on the subject of midwifery, may I be allowed to say that I think there is one condition in which I believe the use of such a dilator as Bossi's would be most timely and good—the condition of greatly protracted first stage with either rigid os or "disturbed polarity"? I have had many cases of this sort, some of which have dragged on for days, wearing out the patient, and laying seeds of future mischief. In a recent case (primipara) the os remained small in spite of vigorous and exhausting pains, the patient became ill, and temperature rose to over 101°. Finally I dilated with the fingers, put on forceps, and delivered a dead child. I believe that had Bossi's dilator been used twenty-four hours earlier, much anxiety to the practitioner, much suffering to the patient, and the child's life would have been saved. In cases of this kind some use cocaine to the cervix. This seems to answer, but seems also to predispose to bad *post-partum* haemorrhage, and so should not be used. I would like to know if any of your readers are familiar with the use of the dilator in the condition named.—I am, etc.,

Cambridge, Sept. 18th. W. J. YOUNG.

SIR,—Your editorial on this subject is very interesting. In ten years' general practice I have only seen one case of placenta praevia, and that was an interesting one. A child of about 11 years came to my door and said her mother was ill. On asking what was the matter the child said, "A cold." I went to the house, and found the mother in bed almost pulseless, the bed and floor below covered with blood. On turning down the bedclothes (as they had been arranged by the "howdy woman" to allow the mother to die in peace) I was astonished to find a placenta and cord between the woman's legs, and a child's head just born. I delivered the child at once, giving it to the "woman" present. I had nothing with me but a hypodermic syringe. I injected some strychnine and digitalin. I then procured a Higginson's syringe, and per rectum injected a large quantity of salt and water. The mother revived and did well. The child lived and to-day is healthy. The explanation of the child's living is to be found in the midwife's description of the case—that is, "She (the patient) had about a couple of good pains, and then the *after-birth and the chile's heed come thegither*." I did not get a chance of seeing the placenta, for when I had finished with the mother the female friends had the cord tied and the placenta in the fire. It was discarded as being small, and the short glance I got of it in the early part of the case confirmed this.—I am, etc.,

Lisburn, Sept. 21st. J. L. RENTOUL, M.B.

THE DIAGNOSIS OF SYPHILIS BY SOME LABORATORY METHODS.

SIR,—In the JOURNAL of August 28th there was a letter from Dr. F. J. Clemenger concerning the simplified methods for the serum diagnosis of syphilis. Working with Professor Sabrazès during the last few months, I have been using a method which is very similar to that of Dr. Fleming. Up to the present the results obtained agree with those given by Dr. Clemenger, both as regards syphilitic cases and controls.

In over 250 observations the number of serums which did not possess any haemolytic power for sheep's corpuscles is 4.5 per cent., but I have never found any difficulty in obtaining a result when the test has been repeated, after adding fresh normal serum.

The important point in such methods is, as Dr. Clemenger points out, the choice of a suitable heart extract. I have made several which have proved to be of no use, but once this has been obtained and the proper dilution found, no difficulty should be encountered. After all, none of the methods, complicated or simple, can be said to be absolutely exact, and the saving of time obtained by using the shorter technique is a great practical advantage.

I should like to add that these simple methods may also be applied to the serum diagnosis of hydatid disease.—I am, etc.,

KENNETH ECKENSTEIN, M.B., B.S.Lond.,
Assistant in the Clinical Laboratory, Bordeaux.

Bordeaux, Sept. 4th.

ACANTHOSIS NIGRICANS AND PROLONGED EXPOSURE TO HEAT.

SIR,—The interesting case of acanthosis nigricans published by Dr. Wild (in abstract) in the JOURNAL of August 28th suggests a comparison of the effects of prolonged exposure to heat with those of chronic *x*-ray dermatitis. The patient, a sugar-boiler, aged 39, developed a number of pigmented warts, chiefly on lips, face, and hands, with roughness, induration, and pigmentation of the skin of face, neck, axillae, and other parts of the body. The warts appeared gradually after removal of a carcinomatous gland from the neck about eighteen months before death. Most of the signs appear to have developed during the same period, although at the time of operation deep pigmentation of the axillae was noted.

From a study of the illustration accompanying the report one would find little difficulty in arriving at a diagnosis of chronic focus-tube dermatitis were one told that the patient had been working with the *x* rays. That observation brings us very much to the position advanced in the first edition of *Röntgen Rays in Medical Work*, in which I first described focus-tube dermatitis as a "species of burn" (p. 115), and pointed out the analogy between dermatitis produced by exposure to the sun, to a focus-tube, and to electric light. My suggestion was that there existed in all those agencies some common traumatic rays capable of stimulating the cutaneous surfaces of the body (sometimes also of the deeper tissues) in varying degrees of severity, probably determined largely by conditions of personal predisposition. In Dr. Wild's case the peculiar predisposing conditions may not unreasonably be ascribed to carcinoma and to the local effects of long-continued exposure (especially of uncovered parts) to the heat of the boilers at which the patient worked.

The coal-black pigmentation of the skin of the neck after exposure to the focus tube is also interesting, and may possibly be connected with the cancerous predisposition. A similar discoloration has been noted after *x*-ray exposure, but so far as I am aware, not specially in connexion with that particular cachexia.—I am, etc.,

London, W., Aug. 30th. DAVID WALSH.

THE EFFECT OF THE LEUCOCYTE COUNT PRODUCED BY THIOSINAMINE INJECTIONS.

SIR,—The clinical experience that Dr. Charteris has had with fibrolysin coincides with its results in a case of mine.

It was used for a haemophilic knee in which movement was limited, though some adhesions had been broken down under chloroform. In the hope of softening those left, and so increasing the range, fibrolysin was tried; 76 injections were given over a period of six months, but the results were disappointing, the increase in the amount of movement being very slight, and not more than could be accounted for by the subsidence of a certain amount of chronic inflammation that took place in the joint during the lengthened period of trial.

It was at first believed that the knee was freer from effusions under the injections, and that when they did occur they cleared up more rapidly; but further experience failed to confirm this, and they were discontinued.—I am, etc., H. S. GETTINGS, L.R.C.P.Edin.

Chasetown, near Walsall, Aug. 31st.

POISONOUS HAIR DYES.

SIR,—With reference to the editorial of last week regarding the evil results of the use of paraphenylendiamine for toilet purposes, having been for some years past in the habit of seeing and treating cases of traumatic dermatitis due to this chemical I am familiar with its effects. Perhaps you will allow me to remind your readers that it is very extensively used for dyeing purposes and that fur workers are continually liable to be affected by it. The condition is probably more prevalent in London than elsewhere, as it is the centre of the fur trade.

When used as a hair dye no symptoms may be produced for weeks or months, but toxic conditions may then appear and are intensified when water is applied to the head.

The danger arising from the use of paraphenylendiamine for toilet purposes is fully recognized by members of the medical profession. Many authors on the Continent[1] have written fully on the subject from observations of cases which have come directly under their notice, while the Government of Saxony has gone so far as to issue an official warning against its use. Dr. Burke, in the *Journal of the American Medical Association*,[2] gives a detailed account of a case of dermatitis caused by the use of a "walnut-juice hair dye." This preparation has also been referred to by other contributors in the *Journal*.[3]

As, however, I do not think any cases of the kind have been recorded in the London medical journals, it may interest your readers to know that I have, within the past week, seen no less than three such cases occurring in healthy females, all of which exhibited the symptoms of typical dermatitis, and were directly traceable to the use of a hair dye containing paraphenylendiamine. The cure for such cases lies in the complete removal of the source of irritation, and this can be best carried out by shaving the head, a procedure which probably results in as little disfigurement and discomfort to the patient as any that can be adopted.

That the manufacturers of these hair dyes are well aware of the probable effect of this chemical is undoubted, and they seek to protect themselves from the consequences by inserting (not in the instructions for application, but inside the lid of the containing box) a notice stating that they cannot be held responsible for any "inconvenience" which may result from the use of the colouring. Apparently the cheapness of the paraphenylendiamine is the only cause of its substitution in place of nitrate of silver and other dyes.—I am, etc.,

London, W., Sept. 22nd. T. P. BEDDOES.

SOME POINTS IN THE MECHANICS OF RESPIRATION.

SIR,—I have read with the greatest pleasure Dr. Scanes Spicer's most interesting, useful, and timely paper on the above subject, which appeared in the BRITISH MEDICAL JOURNAL of September 11th, 1909. And I hope, in the interests of those patients who suffer from respiratory affections of one sort or another—amongst which Keith places visceroptosis—that many of his conclusions "will be embodied in that reconstruction of modern teaching concerning respiratory mechanics which is so urgently needed."

If an appeal is made to Nature for information regarding the correct method of using the respiratory apparatus during muscular exertion, the mechanism employed by the runner who is going strong with his "second wind" naturally suggests itself as the ideal one. This is the mechanism aimed at by the Italian school of voice production, who look upon vocalists and speakers as vocal athletes; it is also the method so well described by Dr. Scanes Spicer, who has suggested the term "back breathing" as more definitive in its leading characteristics than that generally known as costal or thoracic. In the latter the spine is extended at each inspiration, but a greater or lesser degree of spinal collapse takes place during expiration, whereas in "back breathing" spinal extension is maintained throughout the whole of the respiratory act, and perforce expiration then becomes a muscular act, instead of an elastic recoil, as is so generally taught, in spite of the fact that Keith showed some five years ago that expiration, equally with inspiration, was brought about by muscular action.

The good physique of the singer or speaker, who has a perfect command over his or her respiratory apparatus, coupled with the excellent general health such an individual enjoys, speaks volumes for this method of respiration. But such individuals are extremely rare, owing to the unscientific and empirical methods of respiratory culture, which can be properly termed the "Hit or Miss" systems, so much in evidence to-day not only in the vocal, but also athletic, world.

It is not clear to me whether Dr. Scanes Spicer condemns all forms of abdominal breathing, or only the

[1] *Annales de dermatologie*, p. 901, 1902. Berger, *Archiv. of Ophth.*, July, 1909, p. 397. Brocq, *Traité élémentaire de dermatologie*, 1907, vol. i, p. 374. Darier, *Précis de dermatologie*, p. 451. Sabouraud, *Regional Topographical Dermatology*, English edition, p. 29; French edition, p. 31. Dubreuilh, *Précis de dermatologie*, second edition, 1904, p. 208. *Tribune médicale*, March and February, 1901, pp. 172 and 192. Mewborn, *Journ. Amer. Med. Assoc.*, May 18th, 1901, p. 1389.

[2] *Journ. Amer. Med. Assoc.*, August 14th, 1909, p. 528.

[3] Ibid., 1909; February 13th, p. 557; March 6th, p. 787; April 3rd, p. 1121 (with editorial comment).

vitiated type described in his article, and which he calls "Belly Breathing," but which I would term "Pot-belly Breathing," or the type of breathing which tends to produce that abnormal condition in those who eat in excess of the requirements of nutrition, and lead a more or less sedentary life. And teachers who would give, as many do, a victim of this type of respiration exercises in the use of this harmful mechanism are, in my opinion, little short of criminals.

Abdominal breathing, however, as I understand the term, is found in many physiological specimens of humanity—for example, every rightly formed, healthy human infant, unhampered by tight clothing, breathes abdominally; that is to say, spinal extension is a constant factor, the ribs remain stationary throughout the whole of the respiratory act, on inspiration the nostrils dilate more or less, and the upper part of the abdomen—not the whole belly wall—is pushed slightly outwards by the descent of the diaphragm. During expiration the abdominal muscles contract, and the pit of the stomach is drawn inwards. This is the mechanism aimed at (but rarely attained) by the followers of the French School of Voice Production, who argue that as the healthy child is yet to be born that cannot make itself heard in the largest hall, and all normal children, when not exerting themselves violently, breathe abdominally, therefore this method of respiration is the right one, for voice production purposes, at any rate.

Not being an expert vocalist, I am unable to say whether the type of respiration aimed at by the French school or that advocated by the Italian school is the correct one for vocal purposes. But I am convinced from practical experience that both mechanisms should be assiduously cultivated by every one who values his health. Apart from the spinal extensors, the diaphragm and abdominal muscles are those chiefly concerned in the production of these two types of breathing, and inasmuch as they are separate and distinct, it is only reasonable to suppose that unless both actions are daily made use of premature physical and respiratory degeneration is invited.

In by far the majority of cases there is nothing but a lack of proper development of the muscles governing the respiratory act—either of the synergic or fixing muscles, or the true muscles of respiration—or a want of their co-ordinate action that is hindering the reattainment of these much-to-be-desired mechanisms. But, as Dr. Scanes Spicer very truly says, "In adult life such defects can only be corrected by arduous study, practice, and determination."

I practise myself what I teach my patients, and have acquired thereby a degree of immunity from colds, sore throats, headaches, and other ills that few individuals living under modern conditions of life possess at the age of 43, which is my age.

The views I hold on the subject of respiratory mechanics and their relation to health were first introduced by me in a course of Lectures on Personal and External Hygiene given to the officers of the Malta Garrison in the summer of 1905, and later by articles and letters which have appeared from time to time in the BRITISH MEDICAL JOURNAL and the *Journal of the Royal Army Medical Corps*.

In conclusion, I would add that it is most gratifying to me to find that so eminent a member of our profession as Dr. Scanes Spicer, whom I have never seen and with whom I have never had any communication, not only arrives at many of the same conclusions with regard to the mechanism of respiration and its influence upon health that I formed some four years ago, but also, apparently, holds much the same opinion as I do regarding the dangers lurking in present day physical culture methods when uncontrolled by expert medical advice. And it is to be hoped that other medical men will, by their own observations, test for themselves the soundness or otherwise of the views herein expressed.

The following references to the subject may be useful to those interested in it:—Major R. F. E. Austin, R.A.M.C.: "Physiological Exercises for Misused Voices," *Journal of the Royal Army Medical Corps*, August, 1905; "Defects of the Present System of Respiratory Training of the Soldier, with Hints towards its Improvement," *Journal of the Royal Army Medical Corps*, October, 1906; "Respiration and Pulmonary Tuberculosis," BRITISH MEDICAL JOURNAL, December 29th, 1906; "Respiration and Disease," *Journal of the Royal Army Medical Corps*, April, 1907 "Diaphragmatic Drill for the Improvement of the 'Wind' and General Health," *Journal of the Royal Army Medical Corps*, June, 1907; "Respiration and Fatigue," BRITISH MEDICAL JOURNAL, May 1st, 1909. Dr. Keith: "Why does Phthisis attack the Apex of the Lungs?" *London Hospital Gazette*, January, 1904.—I am, etc.,

Chatham, Sept. 20th. R. F. E. AUSTIN, Major R.A.M.C.

THE STRENGTH OF DIGITALINS.

SIR,—An infant who was recently and temporarily under my care with bronchopneumonia was having $\frac{1}{200}$ grain of digitalin (Parke, Davis and Co.) every two hours hypodermically for several days. There was no indication that this dose was in any way excessive. As the adult dose is given as $\frac{1}{60}$ to $\frac{1}{30}$ grain, I concluded that the tablets must be very weak. When standardized physiologically on frogs by the Clinical Research Association, each tablet of $\frac{1}{100}$ grain proved only equal to $1\frac{1}{4}$ minims of a standard tincture (that is, 2 tablets required to kill a 22 gram frog in two hours).

As digitalin is generally used in critical cases where potency and reliability are of the utmost importance, I venture to ventilate the unsatisfactory position in your columns, and trust that any one who has special knowledge and helpful suggestions will follow suit.

Messrs. Parke, Davis and Co. answered my inquiries most courteously, and equally lamented the state of affairs, to which they have responded by issuing a much stronger hypodermic tablet of $\frac{1}{10}$ grain, which should be useful. But they say it is an unsatisfactory product, and recommend digitalone (fluid) instead. In Switzerland recently I heard excellent reports of an aseptic fluid called "digalen," consisting chiefly of digitoxin.

There is great confusion in the profession between digitalin (which is a mild, amorphous glucoside resembling digitoxin in its action) and digitoxin (which is a very toxic cumulative crystalline body). The latter has the same dosage as Nativelle's digitalin, which it resembles ($\frac{1}{250}$ to $\frac{1}{60}$ grain). Hence the confusion in names.

Digitoxin can readily be standardized by chemical (?) or physiological means. But can the same be said of digitalin? Messrs. Burroughs, Wellcome and Co., in kind reply to my inquiries, state that they "are not aware of any reliable method of standardizing these products further than the chemical controls to which they are submitted."

But the main purpose of this letter is to expose the tragic absurdity of the ordinary tablet strength of digitalin being $\frac{1}{100}$ grain if each is only equal to $1\frac{1}{4}$ minims of standard tincture.

There is the wider question of whether the drug which is most potent in arresting the frog's heart is the most successful in healing the human heart. Medical sufferers from heart disease should have special experience of this.—I am, etc.,

FRANK C. EVE, M.D., M.R.C.P.,
Hull, Sept. 14th. Physician, Hull Royal Infirmary.

⁂ Digalen, an amorphous soluble digitoxin, isolated by Professor Cloetta of Basle, was shown at the annual exhibition at Belfast Meeting by the Hoffman La Roche Chemical Co., 7, Idol Lane, E.C., and briefly described at p. 204 of the SUPPLEMENT for August 28th, 1909.

CANCER OF THE BREAST.

SIR,—It would be interesting to know, Is cancer of the breast most common with those women who refuse the duties of nursing their infants, or with those who use this gland for its natural function? Some of your many readers may be able to supply the desired information.—I am, etc.,

September 15th. INQUIRER.

WILLIAM BLAKE'S DRAWINGS.

SIR,—In the Literary Notes in the JOURNAL of September 11th there is a communication from Mr. G. Munro Smith of Bristol, drawing attention to the character of some of William Blake's drawings, and suggesting that the zigzag features which he has introduced are based on the "fortification figures" seen in the migraine aura. I wonder if Mr. Smith is aware that Sir Lauder Brunton, as long back as 1902, in an article printed in the *Journal of Mental Science*, traced a similar likeness in some of

Doré's illustrations to Dante's *Divina Commedia*. If so, the fact should have been mentioned in the Notes; but if not, it is a very interesting point that the two have come to the same conclusions absolutely independently.

Mr. Munro Smith's example is, I must say, more convincing than Sir Lauder Brunton's, even to the point of the "seething" character of the space inside the fortification figures which the sufferers so often describe. If there are any original journals or diaries of Mr. Blake extant, it would be of great interest to search through them with the object of detecting any reference to attacks of migraine, though, even in the absence of any mention of headaches, it must be remembered that the characteristic visual phenomena may be present in some persons without the subsequent headache.—I am, etc.,

Manchester, Sept. 14th. CHARLES H. MELLAND.

SIR,—Production is everything, rather than a fleeting or the critic's judgement, in the estimate of a useful brain. Mr. Smith's note attributing a tiny, dim scotomy for the origin of the peculiarly, but solely and always inspirational drawings of William Blake does not carry definite support. His very strained coincidence does not explain, nor give justice to, William Blake's descriptive power. And, in spite of all the meddling and explanatory critics, William Blake cannot be robbed of what he gave to the world—a simple, abiding, spiritual art and insight, out of his own grace and light, and happily clear of the absolute sanity and decaying day-issues of business clippings.

William Blake was a master, but also in his way a seer, and therefore a genius. The only psycho-physiological border part to be woven into his nature, tenderly and not meanly or critically put, is that he cultivated the receptivity of the seer's art, and, as such, the flexible, but controlled, lability of ideas. That permits largely of the seer's insight and visionary. Shakespeare chose it, taking it from the dominion of words; and it must have helped him to conjure up and clothe his scenes, and tellingly produce a temporary madness in *Hamlet*, his ghosts and that unapproached welding of the sweetest story of entrancement in Denmark of his time. William Blake chose engraving and painting, or, rather, drawing, as his medium to transmit his message. As he communed with the fancies of spirits, and enjoyed apparently fanciful courts with all the ancients, and also, through the bigotry of his times, had to embrace the narrow sphere of the biblical range, he characteristically became forcibly spiritual. I can see nothing psychopathic in his choice. However much one might wish to have seen him exhibit his wonted force in other commoner strains, still, it is nobody's right to cavil or criticize. His occasional excursions of hurried necessity into incidental or general subjects, for Mr. Butts and others, or with the miniatures he did when in lower association with Mr. Haley and the peculiar gentry of Felpham, proved that he might have excelled in successful commercial demands, but consequently in a thoroughly inferior way. If his mild training and the biblical scope of many of his inspirations be borne in mind—and that right of his ought never to be questioned—there will then be found nought to substantiate the usual interference of the critics, and the often insisted upon unnatural and eccentric bent, nor any real trace of the madman about him. He purposely tried, I hold, in his own words, "to see visions, dream dreams, prophesy, and speak parables"; he added, elsewhere, very sensibly in "this spirit of abstraction."

Mr. Smith's attempt to perpetuate the popular fallacy of a wrongly-disordered eccentricity to William Blake, with a negligent derangement of migraine for an obviously broader study in engraving, rests on no solid foundation. Mr. Henry B. Wheatley points out no corroboration can be found in Gilchrist's long *Life*. In the Collected Letters lately published by Mr. Russell no personal complaint occurs to his friends of anything like migraine. He and his wife make mention of suffering severely from ague and rheumatism, due to the dank, horrid Bognorian flats of clay at Felpham. Mr. F. Tatham, too, who was an artist, and described William Blake's process of prints for Gilchrist, in his *Intimate Life* does not mention any reference to sick headaches or eye disturbances. So a suggested resemblance to "fortification figures" in a picture of characterization and chance creation can have nothing whatever tangible to do with his marvellous series of genuine, and not copied, productions. Moreover, the one distortion of migraine, with its known clouding and torpor of mental action, would only be a miserable subterfuge for dexterity, and would rather have stopped and spoilt, instead of produced, the prolixity and delectable magnificence of William Blake's unfettered, and, luckily, sometimes rambling, art. He, like our first admiral, Admiral Blake, preferred moderate poverty with freedom so as to work in his own way.

No, Sir, migraine would be a mean counterpart for William Blake's actual creations! William Blake himself unconsciously summed up his efforts; his own words ran pregnantly: "He who can invent can execute."—I am, etc.,

Bognor, Sept. 14th. H. ELLIOT-BLAKE.

Medico-Ethical.

The advice given in this column for the assistance of members is based on medico-ethical principles generally recognized by the profession, but must not be taken as representing direct findings of the Central Ethical Committee.

"CONTRIBUTIONS" IN THE *MEDICAL DIRECTORY*.

NEWLY FLEDGED asks whether there is any objection to giving non-medical contributions in the *Medical Directory* under the heading of "Contributions," and he draws attention to the fact that non-medical contributions appear under the names of certain practitioners.

*** The usual custom is to restrict such contributions to those on subjects related to medicine and the allied sciences, but a cursory examination of the *Medical Directory* confirms our correspondent's statement that the editors allow references to be made to publications which have no such relation. We are, therefore, of opinion that our correspondent may mention his photographic writings without fear of being charged with an infringement of medical etiquette.

ADVERTISING.

A MEMBER asks whether it is right for a medical practitioner to display a large and prominent notice in a grocer's shop to the effect that messages will be immediately forwarded to him, he living two or three miles away.

*** It has been frequently pointed out that such notices can only be excused in wide-spreading country districts, and in the suburban neighbourhood from which our correspondent writes such a notice does not seem to be needed. We would suggest that the conduct of the practitioner concerned should be brought before the local Division of the Association.

OPTICIANS AND SIGHT TESTING.

P. J. B. sends a cutting from a local newspaper containing an account of the arrangements made by a local optician for sight testing and the supply of spectacles. He is said to have obtained the services of a gentleman as "oculist and consulting ophthalmic expert who comes from the north of England, where for many years his careful attention in all cases where the accurate fitting was the matter of the greatest importance has won for him the commendation of the medical profession as a whole." Presumably this "oculist and consulting ophthalmic expert" is not a member of the medical profession, and this is only another example of the pretensions of "oculists" to which this JOURNAL has drawn attention many times and at considerable length.

Medico-Legal.

DEATHS UNDER CHLOROFORM ANAESTHESIA.

AT Barnsley, on September 14th, an inquiry was held into the circumstances attending the death of a man during chloroform anaesthesia, at Beckett Hospital. The jury returned a verdict of death from collapse, attaching a rider to the effect that the medical men concerned were in nowise to blame, and were entitled to much sympathy in regard to the occurrence. The patient had been brought to the hospital from the workhouse for the performance of what appears to have been an operation for empyema. Owing to his condition the medical men objected to putting him under general anaesthesia, and commenced the operation under eucaine. The patient strongly protested, and

when the operation was half through declined to allow it to continue unless he were given chloroform. Its administration was therefore reluctantly commenced, but before the patient was completely under its influence heart failure set in, and the patient could not be brought round in spite of massage, the injection of ether, and the maintenance of artificial respiration for over two hours.

At Bristol, on September 15th, an inquest was held on the body of a boy, aged 12, who died at the isolation hospital during the performance of a tracheotomy. A local anaesthetic not proving effective, chloroform was given, and the deceased almost immediately collapsed. The *post-mortem* examination showed that the heart was in a state of fatty degenerstion. The patient had been admitted the same day, late in the course of a severe attack of diphtheria.

THE EFFECTS OF BELLADONNA LINIMENT.

X. writes that a patient was treated by him with belladonna liniment, the use of which was followed by a troublesome rash. When the rash appeared a friend took her to another medical practitioner, who declared she was suffering from belladonna poisoning, and at once undertook her treatment. She appears to have got worse instead of better, and now claims that X. should pay the doctor's bill. He wishes to know whether this would be reasonable.

*** X. should repudiate any liability in the matter.

LOCUMTENENT AND COMPENSATION FOR INJURIES.

A CORRESPONDENT inquires whether a locumtenent can legally claim from his employer compensation for severe injuries received while riding a bicycle in the performance of his visiting duties, which disabled him for four weeks. He was engaged on the understanding that he provided his own bicycle, and he would like to know further whether the employer is not also liable to pay for the repairs of the bicycle, which was also much damaged by the accident.

*** If our correspondent were habitually engaged every year by the same employer as locumtenent he might have a claim under the Workmen's Compensation Acts. Otherwise his employer is not legally liable to pay any compensation for such an accident. If he were entitled to compensation, he could only claim half his salary for the time during which he was disabled, and no allowance would be made for the damage to bicycle.

The Services.

COURT-MARTIAL ON A FLEET SURGEON.

ON September 16th a court-martial was held on board the *Victory* at Portsmouth, for the trial of Fleet Surgeon Charles G. Matthews of the *Fisgard*, boy-artificers' training establishment, who was charged with behaving with contempt towards Commander Richard H. Walters, his superior officer, also with wilfully disobeying the commands of Commander Walters, his superior officer. According to a report published in the *Times* of September 17th, Commander Walters said that on September 3rd he was in command of the *Fisgard* during the absence on leave of Captain E. Hyde Smith. During the forenoon of that day he saw the prisoner coming aboard in plain clothes after the boy-artificers had been dismissed for divisions, about 9.20 a.m.; he therefore sent for the prisoner to his cabin and asked him whether he had read his (the witness's) order book. The prisoner replied "No." He gave the book to the prisoner and told him where to initial it when he had read it. He then told the prisoner that the orders of the ship were that all officers must be aboard by divisions in the morning, and as it delayed the boy-artificers going to their instructions, if he did not come aboard at that time he must conform to the orders. The prisoner replied, "I refuse to obey your orders." The witness thereupon sent for Lieutenant Gouldsmith to witness the order he was about to give the prisoner. The witness made an accidental mistake in the prisoner's name. The latter called his attention to this, and upon the witness asking what his name was the prisoner made a contemptuous remark to the effect that "If you look for it in the Navy List you will find it." A little later the prisoner told the witness his name. The witness then ordered the prisoner to be on board at nine in the morning and personally report the sick to him. When this order was given to the prisoner in writing the latter refused to initial it. The witness replied that if he did not he would be put under arrest. The prisoner then said he would sign it if it were understood that he signed only as having seen the orders, not as accepting them as binding upon him. The witness declined to accept any conditions and said the prisoner could complain to the captain on the latter's return. The prisoner then left the cabin. The witness wrote in the log, "Cautioned Fleet Surgeon Matthews for behaving with contempt to me as commanding officer of the ship." This the witness sent by Lieutenant Gouldsmith to the prisoner for him to sign. It was returned with the following addition written underneath by the prisoner, "Signed by order of the commander but not as an admission of the offence alleged, nor as having received the caution referred to." The witness sent for the prisoner, told him he had no right to make such an entry in the log, struck out what the prisoner had written, and ordered him to sign the log. As the prisoner refused to do this the witness placed him under arrest, but liberated him at 3 p.m. the same day and ordered the prisoner to report himself at 8.55 a.m. every day.

In cross-examination by the prisoner, the witness said that the prisoner asked him to refrain from altering the routine until the captain's return, but this was not until the witness had threatened to put him under arrest for not obeying orders.

The Prisoner: Do you suggest I said I would not obey the orders in your order-book until the captain's return? — The Witness: Not exactly in those words. You at first refused to initial my order-book. Then, after I had threatened to put you under arrest, suggested some conditions which I should accept.

Replying to further questions from the prisoner, the witness said that whilst waiting for Lieutenant Gouldsmith to come, the prisoner expressed readiness to obey any orders given by the witness in the captain's absence. The witness did not actually administer the caution referred to in the log, but intended the entry to constitute the caution. The witness admitted referring to the prisoner as "Dr. Richardson, Dr. Richards—or the Fleet Surgeon anyhow," but did not apologize for making an error in the name owing to the prisoner's irritating and contemptuous manner.

Lieutenant Arthur Neville Gouldsmith, R.N., corroborated the previous witness's statement as to what took place in the commander's cabin. He added that the prisoner's manner towards the commander was courteous except in one instance, that being when the commander gave him an order to initial the log, and the prisoner would not reply.

Did you consider the prisoner's manner contemptuous when he told the commander he could find his name in the Navy List? asked the prosecutor. "No," was the witness's emphatic reply.

Captain E. Hyde Smith, commanding the *Fisgard*, said that he had verbally made three exceptions to his orders as to officers coming on board at 8.30 in the morning, the prisoner being one of the officers thus excepted. He told the prisoner that he should be aboard so that the boy-artificers were not delayed in going to the workshops in the morning. This would mean the prisoner being on board about 9.20 or 9.25 a.m. The witness did not tell the commander of the verbal exception he had made in the prisoner's case. Replying to the prisoner, the witness said that the prisoner's conduct had been satisfactory to him; also that he (the witness) had found it necessary to issue orders defining the commander's position aboard the *Fisgard*, as there seemed some misunderstanding about it.

The prisoner, in his defence, denied that he behaved contemptuously towards Commander Walters, or that he refused to carry out his orders.

The Court found that the charges were not proved, and acquitted the prisoner, to whom the President handed back his sword.

ROYAL NAVY MEDICAL SERVICE.

DEPUTY INSPECTOR-GENERAL C. BUCHANAN-HAMILTON (RETIRED) writes: In the excellent Educational Number of the BRITISH MEDICAL JOURNAL you hardly do the Royal Navy Medical Service justice, inasmuch as the grant of a free ration is unnoticed, as by this officers can maintain an excellent mess for the small sum of 2s. per diem. They had also a free spirit ration suitable for men (Viri) keeping the seas, but this of recent years has been discontinued.

INDIAN MEDICAL SERVICE.

R.N. writes: The letter of "Major, I.M.S." in the JOURNAL of September 18th (p. 825) is most valuable. The emoluments of the Indian Medical Service have never been stated in English money before. He gives his ordinary pay as Rs.900 (£60) a month, with increments that did in his case amount to another £20—£720 per annum almost certain, and perhaps £960 with luck. A naval medical officer of sixteen years gets £365, with very little chance of increment. The Indian medical officer has, of course, more expenses, but no one who has seen them at work will deny that they are much more comfortably off than officers of the Royal Navy Medical Service, while his last paragraph gives food for reflection to those of us who have joined that service.

TERRITORIAL FORCE.

THE MEDICAL ORGANIZATION OF THE TERRITORIAL FORCE.

MAJOR E. CARRICK FREEMAN, M.D., Staff Officer to A.M.O., East Anglian Division, writing in reference to the paragraph headed "The Obstruction of Medical Organization Territorial Force," which appeared in the JOURNAL of September 11th, points out the proper remedy in cases in which head quarters are inadequate. He says: The commanding officer of the field ambulance concerned should apply in official form to the Administrative Medical Officer of his division in the Territorial Force stating his grievance and the failure of his County Association, after official application, to remedy it. The Administrative Medical Officer would then himself set forth the case to the County Association, and, if he did not obtain satisfaction promptly, would write to the

General Commanding the Territorial Division. He would in this letter point out that the field ambulance in question had no adequate accommodation for the proper training of its men, and that they, in consequence, being unable to carry out the drills laid down in the regulations, were in a fair way to be debarred from obtaining the annual efficiency grant.

He could also draw attention to the very adverse effect the lack of head quarters exercised on recruiting. It might also be the case that from lack of proper storage accommodation the field ambulance had been unable to receive or to keep in good order its mobilization equipment, and therefore was not in a position to be available on sudden mobilization; if so, this fact should also be duly reported. The matter would then pass into the hands of the military authorities, and your correspondents would soon find their legitimate necessities attended to by the County Associations concerned.

Public Health AND POOR LAW MEDICAL SERVICES.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

Manchester.—The annual report of the Medical Officer of Health for Manchester for the year 1908, which has just been issued, is a most valuable book of 250 pages containing not simply statistics, but a series of useful monographs on various subjects affecting the health of the city. The population is estimated at 648,846, with an annual birth-rate of 28.89, and a death-rate of 18.1 per 1,000. The birth-rate is 0.5 per 1,000 higher than in 1907, but 3.05 lower than the mean for 1891–1900. The death-rate is 0.2 per 1,000 higher than in 1907, but 4.4 lower than the mean for 1891–1900. This difference in the death-rate means a saving of 2,551 lives in the year, though Manchester is still in a bad position compared with the seventy-six other large towns, and it is noted that it is in the middle period of life that the rate is so excessive in Manchester. The extent of unemployment in the second half of the year was very great, and there can be no doubt that a high degree of poverty generally means a high death-rate. The infant mortality was 152 per 1,000 births, while in 1907 it was 147, and in 1902 it was 151; but, except for these two years, it was lower than in any previous year. It is noted that in recent years there has been a shifting of the mortality, so that it has become relatively more severe in the first three months of life; not that there is any absolute increase, but that the improvement is less in the first three months. It is suggested that "this may with a high degree of probability be held to indicate that less care is bestowed on the physique of the mother than is given to the nurture of the infant." A useful table shows that the general death-rate descends from birth to the age of 10 to 14, and then gradually begins to ascend. The death-rate at all ages in males exceeds that in females by 3 per 1,000; this is due in some measure to the fact that a considerable section of males live in common lodging-houses, and are exposed more to the injuries and stress of occupations than females. By far the highest death-rates occurred in the central districts and in Ancoats and Hulme, while the lowest were in Harpurhey, Withington, Cheetham, and Moston. The total deaths numbered 11,930, and the chief causes of death were: Pneumonia, 1,293; bronchitis, 1,150; phthisis, 1,088; heart disease, 1,119. There were fewer deaths from lung disease than in 1907, but an increase under diarrhoea and infectious diseases, and the deaths from cancer, which in 1907 numbered 493, in 1908 reached the high figure of 584. Pneumonia and bronchitis are lower than the average for the last ten years. It is noteworthy how tuberculous and other respiratory diseases increase in the central areas at ages 45 to 65, while they decrease in North and South Manchester, and we are told "it is therefore on the lungs that the gathering fatality in the central parts of Manchester expends itself with the advance of years." There was a general increase in the notifiable infectious diseases which cannot be explained, and seems to depend on epidemic laws not properly understood. No cases of small-pox or of typhus fever were notified. Scarlatina, however, was more prevalent than in any recent year, except 1906, though, on the whole, it was of a milder type. There was also a slight increase of diphtheria. Enteric fever shows a greater number of cases than in any year since 1898, and the death-rate was also very high. Measles and whooping-cough cause great trouble owing to the carelessness of parents about isolation, and the great number of deaths from these two diseases is a matter of the greatest concern. The death-rate from phthisis was lower than in any previous year except 1905, and it is evident that the efforts of the health authorities to prevent the spread of the infection are bearing fruit. It is somewhat disquieting, however, to find that Manchester has still by far the highest death-rate among males from phthisis of all the great towns of England and Wales. A full account is given of an investigation into an outbreak of poisoning by arsenical sweets. No fewer than 56 school children, with 5 others under school age and 1 adult, were affected. The sweets were sold at 4 oz. for 1d., and an ounce contained about ten sweets. The effect after eating even one sweet was severe vomiting, generally within an hour, and the effects after eating a large quantity do not appear to have been either more severe or more lasting. In some cases there was abdominal pain and purging, but in most cases, after vomiting, the children were quickly well. Of all the children affected, only 5 missed school for half a day and only 1 for two days. Professor Delépine found that each sweet contained about $\frac{1}{20}$ grain of arsenic and no other poison. Samples of the raw materials were obtained, and were principally glucose, sugar, and starch, but no arsenic was found in any of the samples examined, and up to the present no explanation has been obtained of the presence of so large a quantity of arsenic in the sweets. The outbreak brings into sharp contrast the effects of acute and chronic arsenical poisoning. In the former there is vomiting and diarrhoea, with rapid recovery, as in all these cases, while with very small repeated doses, as occurred in the arsenical beer poisoning, there are symptoms of a cold in the head, with anaemia, pigmentation, tingling in the hands and feet, muscle atrophy, and great weakness which lasts for months and may be fatal. Much attention has been paid during the year to the housing of the working classes, and somewhat acrimonious disputes have arisen, especially with property owners. No less than 2,844 midden privies and 10,081 pail closets have been converted into water-closets. In every case attention has been paid to the general sanitary condition of the houses, and if this was not found satisfactory the conversion was arrested. An allowance of £2 for every pail closet altered to a water-closet is made to owners by the Corporation, but sanction for the alteration is not given, and the £2 not paid, until the houses themselves are made fit for human habitation in other respects. Good work has also been done in dealing with back-to-back houses. A scheme for the erection of tenements was not carried out owing to the opposition to what are called "barrack dwellings." The Housing Bill, 1909, will give the sanitary authorities far greater powers in dealing with insanitary houses, but there are some complaints from property owners that the great bulk of the expense falls on them, and the closing of so many insanitary houses has left a scarcity of small houses suitable for newly married people and has enhanced the rents of those that are left. Nevertheless the medical officer of health is confident that the work that is being done will greatly improve the sanitary condition of the city and will be reflected in the health reports of the future. The report gives a detailed statement of the work of the health visitors, who, since March, 1908, have been taken over entirely into the service of the Corporation. The duties of the health visitors are mainly to visit infants under 12 months of age and to instruct mothers in everything relating to the welfare of the children, to visit notified cases of phthisis and give instructions in the prevention of infection, and to make a systematic house-to-house visitation to discover the simpler sanitary defects. Their work covers a large field left untouched by the sanitary inspectors in connexion with general household arrangements. At the end of 1908 they had 533 cases of phthisis under observation, visiting each case regularly to see that the house was kept clean, and that the patient carried out instructions for preventing infection. They also record over 36,000 visits to infants and over 9,000 house-to-house inspections. They appear to have distributed a considerable amount of personal help in the way of food, milk, and clothing, which is mostly provided by the Ladies' Public Health Society, as well as recommends to various charitable institutions. The health visitors, of course, have no right of entry to any house, and have often to use tact to get the confidence of people. They are specially enjoined to use great care not to interfere with the work of medical practitioners or midwives. They often advise the calling in of medical assistance, but on no account may they offer any independent medical advice or criticize the orders of doctors or midwives. A successful Guild for Mothers has been established during the year in Ancoats under the auspices of the Ladies' Public Health Society. The Guild seeks to lessen the infant death-rate by providing dinners at small cost to pregnant and nursing mothers, by demonstrations in cookery, clothing, and domestic economy, and by medical consultations for delicate babies up to the age of 12 months. The advice given amplifies that of the health visitors, who in turn find suitable cases for the Guild to assist.

The report of the work of the Midwives Supervising Committee was summarized in the JOURNAL of July 24th.

BLACK SPOTS ON CHILLED BEEF.

IMPORTERS of chilled beef from the Argentine recently have been much exercised on account of the presence of more or less circular black spots which have made their appearance upon certain consignments which have arrived in this country. With a view to ascertaining the nature of this unusual appearance, Professor Klein was requested by the Frozen Meat Association to make suitable investigations. A report which he has just issued on the subject is of reassuring character. He found that the spots were caused by a fungus of the nature of an oïdium, and which he has named *Oïdium carnis*. The mycelium forms oval gonidia, either by short lateral branches of the free hyphae, or along and at the ends of the superficial threads in the fat tissue. In both instances the oval gonidia are capable of multiplying in the manner of yeast cells. Experiments upon guinea-pigs with large doses of an emulsion of the mould gave a negative result. No change in the animals' condition was noticeable. In spite of this satisfactory conclusion to Professor Klein's observations, it is probable that purchasers will still

desire to have meat which is not spotted with *Oïdium carnis*, so that those who are concerned in the trade would be well advised if they sought some means of preventing the growth of the fungus.

APPOINTMENT AT LEIGH.

THE recently instituted post of School Medical Officer and Medical Officer of Health for the Borough of Leigh, Lancashire, was filled on September 14th by the election of Dr. Frederick Wynne of that town. There were sixty-one candidates. In sanctioning the salary of £400 per annum, the Local Government Board stipulated that the holder of the office should be allowed to accept other public appointments approved by the council; to take pupils; to make pathological and other examinations for practitioners; to act as consultant in cases of infectious disease; to make *post-mortem* examinations; and to act as a medical witness in courts of law.

OXIDE OF IRON IN WATER.

H. R. writes: My water supply is from a shallow well in gravel. If the water is left for a day or two in w.c. cistern without emptying, when drawn off it is quite red from oxide of iron (I suppose). The water, however, in a large galvanized cistern is not red, proving that the iron is not in the water, but is caused by the action of the water on the iron fittings. What ingredient in water would have this effect?

THE M.O.H. AND THE PRACTITIONER IN SCARLET FEVER CASES.

J. F. R.—Most medical officers of health direct an infected house to be disinfected at the request of the medical man who has been in attendance upon the infected patient. The Local Government Board has several times pointed out the impropriety of a medical officer of health visiting the patients of other practitioners except in consultation. The power possessed by the sanitary authority to disinfect a house is contained in Sec. 120 of the Public Health Act 1875, as follows:

"Where any local authority are of opinion, on the certificate of their medical officer of health, or of any other legally qualified medical practitioner, that the cleansing and disinfecting of any house or part thereof, and of any articles therein likely to retain infection, would tend to prevent or check infectious disease, it shall be the duty of such authority to give notice in writing to the owner or occupier of such house or part thereof requiring him to cleanse and disinfect such house or part thereof, and articles within a time specified in such notice."

If the notice is not complied with a penalty may be enforced, and the local authority must carry out the disinfection, and may recover the cost from the owner or occupier of the house. Where the Infectious Disease Prevention Act 1890 has been adopted, the above section is superseded by Sec. 5 of that Act, the material difference being that the clerk of the authority must at once act upon a certificate of the medical officer of health, or of a registered practitioner, and insist that a house which is certified to require it is to be disinfected. For the purpose of carrying out this section, officers of the local authority have power of entry upon premises between 10 a.m. and 6 p.m.

W.-C. FLUSHES.

COLONNA.—It is extremely important that the water used for flushing a water-closet should pass through a disconnecting cistern. This is provided for, as a rule, in the regulations of the water supplying authority. A water-closet with the flushing pipe in direct communication with the main water supply would be a nuisance and injurious to health and could be dealt with as such under the provisions of Sect. 91 et seq. of the Public Health Act 1875.

Obituary.

THE funeral of Dr. THOMAS BRIDGWATER took place on September 11th in the parish church of Glasbury (Breconshire). The funeral service in the parish church was fully choral, the officiating clergyman being the Vicar of Glasbury, the Rev. Mr. Gibbons, who was assisted by the Rev. John Bridgwater, nephew of Dr. Bridgwater, and Vicar of Old Charlton. The mourners were Messrs. Harvard Bridgwater, his son, Harold Bridgwater and Thomas Bridgwater, his nephews. There was also a large assembly of friends in the church. The grave, which was alongside the last resting place of Dr. Bridgwater's relatives, was lined with moss and white flowers. The following was the inscription on the coffin: "Thomas Bridgwater, 85 years, 8th September, 1909."

THE prizes of the Royal Dental Hospital of London will be distributed by Sir Victor Horsley, F.R.S., at a *conversazione* to be held at the Royal Institute Galleries, Prince's Hall, Piccadilly, on Wednesday, October 20th, at 8 p.m.

Letters, Notes, and Answers.

BRITISH MEDICAL ASSOCIATION AND BRITISH MEDICAL JOURNAL.

THE offices of the British Medical Association and of the BRITISH MEDICAL JOURNAL are at 429, Strand, London.

COMMUNICATIONS respecting Editorial matters should be addressed to the Editor, 429, Strand, London, W.C.; those concerning business matters, advertisements, non-delivery of the JOURNAL, etc., should be addressed to the Office, 429, Strand, London, W.C.

TELEGRAPHIC ADDRESS.—The telegraphic address of the EDITOR of the BRITISH MEDICAL JOURNAL is *Aitiology, London*. The telegraphic address of the BRITISH MEDICAL JOURNAL is *Articulate, London*.

TELEPHONE (National):—
2631, Gerrard, EDITOR, BRITISH MEDICAL JOURNAL.
2630, Gerrard, BRITISH MEDICAL ASSOCIATION.
2634, Gerrard, MEDICAL SECRETARY.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

CORRESPONDENTS not answered are requested to look at the Notices to Correspondents of the following week.

MANUSCRIPTS FORWARDED TO THE OFFICE OF THIS JOURNAL CANNOT UNDER ANY CIRCUMSTANCES BE RETURNED.

In order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL, and not at his private house.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

DR. WILLIAM ODELL (Ferndale, Torquay) writes: A lady medical missionary is anxious to obtain a "Harvard" or similar chair for operating purposes, and I shall be glad if any member of the Association having one to dispose of at a small cost, will kindly communicate with me, stating price, etc.

ANSWERS.

LITHOS.—We know nothing of "Sal Hepatica" beyond what is stated in the advertisements. We have made inquiries, but cannot find that the preparation has been examined or that its composition is known in this country.

IGNORAMUS asks what outfit is necessary for the most recent and approved method of producing high-frequency currents.

*** The essential parts of a high-frequency apparatus are a condenser, spark-gap, solenoid, and resonator. The secondary discharge from an induction coil is connected to the inside coatings of the condenser, which preferably takes the form of a series of metal plates. These plates are separated from one another by glass, or, what is now considered more satisfactory, mica. The spark-gap is usually a glass cylinder with ebonite ends. The solenoid is constituted by a coil of copper wire connecting the outside coatings of the condenser. The resonator most generally employed is that of Oudin, and consists of a number of continuous turns of wire which are wound on a cylindrical wooden framework. In applying the currents a large helix for autoconduction and a condensation couch, as well as special electrodes for the effluve, may be required. A book which goes very fully into the question of apparatus is the 1907 edition of Crookes's *High Frequency Currents* (Baillière, Tindall and Cox). Mr. W. Duddell, F.R.S., devoted his presidential address before the Roentgen Society to modes of production of high frequency, and the paper—a very valuable one—is published in the Journal of the Society for December, 1907.

BUTTER-MILK.

RUSTICUS.—The composition of ordinary butter-milk is: Water, 91 per cent.; protein, 3 per cent.; fat, 0.5 per cent.; sugar, 4.8 per cent. It differs from full milk which has been soured by lactic acid bacilli in containing much less fat. In what is now known as the "sour milk treatment" the milk is soured by the addition of a special breed of lactic acid bacilli derived from Bulgarian sour milk. These are more active and resistant than the ordinary lactic acid bacilli found in butter-milk, and the latter is on that account believed to be less effective in promoting a diminution of intestinal putrefaction. It should be noted, however, that any form of milk, if taken in sufficiently large quantity, tends to lessen intestinal putrefaction.

RECOVERY OF THE ABATEMENT OF DUTY ON PETROL.

"A. B." refers to the reply of "D. P." in the issue of August 21st, and states that he has applied to the local officer of Customs and Excise, only to be informed that the officer had no instructions in the matter. If "A. B." will apply again to the officer he will shortly be furnished with the necessary forms, as we understand that specific instructions have now been given for the treatment of the abatement claims of medical men, and special forms are about to be issued. The conditions referred to in the former reply are those imposed generally where motor spirit is used for any non-dutiable or half-dutiable purpose.

LETTERS, NOTES, ETC.

TUBERCULOUS SINUS.

IN the sixth line of Dr. T. Walker Love's communication, published last week, p. 828, the word "anal" should have been "Anel."

COLOUR BLIND ENGINE DRIVERS IN FRANCE.

WE regret that in our reference to the paper by Clerc on the vision of French railway drivers, in the JOURNAL of September 18th, p. 811, we did not give Dr. Edridge-Green the priority to which he is entitled in pointing out the necessity for examining engine drivers with a lamp test. Dr. Edridge-Green has been not only the pioneer, but the most energetic of those who have worked to bring about a reform in this matter.

DUTCH DROPS.

DR. Y. M. JONES-HUMPHREYS (Cemmaes, Montgomeryshire) writes: In Hoblyn's *Dictionary of Terms used in Medicine*, eighth edition, published in 1858, I find the following: "Dutch Drops. Haarlem Drops." The basis of this nostrum consists of the balsam of turpentine. A preparation, however, is frequently sold as "Dutch drops" which is a mixture of oil of turpentine, tincture of guaiacum, and spirit of nitric ether, with small portions of the oils of cloves and amber. When a student at Guy's a sailor on a Rotterdam boat told me of the preparation, which he said was largely used in Holland for lumbago and rheumatism; and some years ago a patient asked me if I could get him some, he being a great sufferer from lumbago.

THE TREATMENT OF BOILS.

DR. DOUGLAS MACDONOGH, D.P.H. (London, N.), writes: I notice in the Epitome of Current Medical Literature in the JOURNAL of September 11th an account from the *American Journal of Medical Sciences*, of treatment of boils by carbolic acid. I have myself for many years treated them by a pointed wooden match—or harder wood—dipped in pure carbolic, and a simple antiseptic dressing; of late years a pad of lint steeped in hot cyllin solution. I have always found it satisfactory, though it may have to be repeated several times in troublesome cases. The first application generally relieves the pain. I treated a very large boil on the back of a man's neck some few months ago in this way, without leaving any mark, and I use the same treatment in any stage of the disorder.

SPECIFIC GRAVITY OF THE URINE IN HEALTHY WOMEN.

C. writes: In the JOURNAL of September 11th Dr. French claimed to show that the urine of normal women possesses a high specific gravity. The women he chose were not, strictly speaking, normal. As a nurse, each was engaged on what is, for a woman, an excessive amount of physical work. This naturally sends up the specific gravity. Such high figures as he records are not found in women leading a less strenuous life. The average woman's urine has the same specific gravity as that of the average man.

FEEDING AND CARE OF INFANTS.

THE National League for Physical Education and Improvement is issuing cards containing hints on the feeding and care of infants. It can be said that the majority of the instructions have been carefully and well selected, and are expressed in terms calculated to impress their importance upon mothers and nurses. Most of the instructions, indeed, could hardly have been improved upon for their purpose. It may be pointed out, however, that the opening sentence on hand-feeding, "When the breast is not enough give cow's milk and water or barley water as well," is not sufficiently clear. Many mothers, we have little doubt, would infer from it that barley water might be used as the equivalent of cow's milk and water. The instructions as to the preparation of barley water, too, might be fuller and more precise. These points are of minor importance. To the advice, however, "If cream be obtainable add one teaspoonful in each bottle up to five months old; if not, give one teaspoonful once a day of cod-liver oil," we would take the strongest exception. To add a teaspoonful of cream to each bottle, irrespective of the age of the infant and the amount of the feed, is to court a grave risk of causing vomiting, and, possibly, diarrhœa as well. Cod-liver oil, too, is not a drug to be left to the discretion of even the most intelligent mothers. Given in a teaspoonful dose at any time it is apt to upset the digestive system of any infant, and in hot weather the results would probably be disastrous. We would strongly counsel the omission, or very careful alteration, of the whole sentence in future cards of instruction.

RHINOLOGY AS AN AID TO DIAGNOSIS OF PULMONARY TUBERCULOSIS.

MR. W. C. RIVERS, in the course of a letter on this subject, asks for space to make some observations on the criticism of his Belfast paper on rhinological evidence of phthisis. He writes as follows: Captain Sharpe states that it is fairly generally known that nasal deformities favour the development of consumption. This must mean those affected thus are specially likely to become phthisical; and therefore, logically and mathematically, that consumptives present a larger proportion with nasal defect than do the non-tuberculous. But then he also says that another matter of fairly common knowledge is that nasal deformity abounds so amongst both consumptive and non-consumptives, as to have no pulmonary diagnostic significance. In the same breath, then, it is asserted that affections of a certain nature are so rife amongst consumptives as to constitute a cause of their condition, and yet that they are not in the smallest degree characteristic of them. The preponderance of nasal insufficiency amongst my tuberculous cases is surely real enough. 12 per cent. excess as regards septal deformity, 10 per cent. for atrophic conditions, 7 per cent. for post-nasal catarrh, and 24 per cent. for a positive anamnesis—these strictly minimum estimates, in the formation of which subconscious mental bias has been very fully guarded against, and up to a good total, even allowing for entry of the same case under different headings. Supporting the facts described in this paper there is a widespread literature; against them, as far as I am aware, only Gottstein's: "It is not known to me that consumptives are specially characterized by liability to nasal disease"; and Ingals's fanciful exercitation; neither author recording any actual examination of control cases.

ALLEGED PERSONATION.

MR. WILBERFORCE J. J. ARNOLD, B.A., M.B., Colonial Surgeon, Island of St. Helena, writes, under date August 14th, as follows: I have received by the last mail a letter from Liverpool, informing me that some one had presented himself at the Royal Southern Hospital in that city, and gave my name as his own, stating at the same time that he was home on leave from St. Helena. He represented himself as an invalid, and was admitted with a view to operation; but prior to the operation he obtained a loan of money on a plausible pretext from a member of the staff, and disappeared. It subsequently transpired that the same man had been operated on at the Northern Hospital at Liverpool, and by similarly using my name had succeeded in borrowing several sums of money. He answered questions as to qualifications, etc., correctly, having doubtless gleaned information from the *Medical Directory*. He is described as being about 5 ft. 7 in. in height, of slight build, looking about 28 years of age, though giving his age as 44, with dark hair, and a small moustache. He has an impairment of speech, and a slight paralysis of face and arm on the right side. He may still be pursuing his course of fraud, and, if not using my name, may be attempting to pass under that of another medical man abroad. On this account, I have thought it my duty to make the facts public. In cases of doubt, should any medical man's name in the Colonial Service be made use of, information can be at once obtained from the Colonial Office. I have no idea as to the identity of the individual who has impersonated me in Liverpool, but write in the hope of assisting to check the career of an impostor.

THE CAUSES OF PUERPERAL FEVER.

DR. A. P. THOM (Mount Magnet, Western Australia) writes: In the JOURNAL of June 19th your special correspondent stated the remarkable fact that in Salford there were more cases of puerperal fever amongst the cases attended by doctors than amongst those attended by midwives. It is remarkable, but none the less it has been my conviction after an experience of twenty-six years, that there are two or three times as many cases of puerperal fever amongst women attended by doctors than amongst those attended by midwives. The reason for this is the greater amount of handling to which the patient is subjected from doctors, and the too frequent use of the forceps without proper preparation. Another point I would like to emphasize is the frequency of tears of the perineum in spite of precautions, possibly every fourth or fifth case which requires stitching up immediately, however small they may be. My experience has been gained in England and Australia.

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